

Annual Report for Period:10/2010 - 09/2011**Submitted on:** 09/30/2011**Principal Investigator:** Liotta, Louis J.**Award ID:** 0622540**Organization:** Stonehill College**Submitted By:**

Liotta, Louis - Principal Investigator

Title:

A Public - Private Partnership to Increase Enrollment, Retention, and Diversity in Chemistry, Biology and Biochemistry

Project Participants**Senior Personnel****Name:** Liotta, Louis**Worked for more than 160 Hours:** Yes**Contribution to Project:****Name:** James-Pederson, Magdalena**Worked for more than 160 Hours:** Yes**Contribution to Project:****Name:** Almeida, Craig**Worked for more than 160 Hours:** Yes**Contribution to Project:****Name:** Curtin, Maria**Worked for more than 160 Hours:** Yes**Contribution to Project:****Name:** Twomey, Kendra**Worked for more than 160 Hours:** Yes**Contribution to Project:****Name:** Tilley, Leon**Worked for more than 160 Hours:** Yes**Contribution to Project:**

In the Fall of 2006, Dr. Tilley taught General Chemistry, the particular class targeted by this grant with a goal to improve retention of students. He also received a single course reduction in the Fall of 2006 and a double course reduction in the Spring of 2007 in order to develop a General Chemistry section based on the theme of forensics to be offered in the Fall of 2007. He sections of forensics-themed General Chemistry in the Fall of both 2007 and 2008 and two sections in the Fall of 2009.

Name: Turner, Marie**Worked for more than 160 Hours:** Yes**Contribution to Project:**

In the Falls of both 2006 and 2007, Dr. Turner taught General Chemistry (traditional format), the particular class targeted by this grant with a goal to improve retention of students. Because of her background, she has assumed the role of a natural mentor to many students of diversity.

Name: Deluca, Jane**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Supervised two summer research students. No funding from the grant.

Name: Schnitzer, Cheryl

Worked for more than 160 Hours: Yes

Contribution to Project:

Started the development of a Theme-Based General Chemistry based on the environment. Received a course reduction but no monetary support. Teaches theme-based general chemistry based on the environment. She taught this theme-based course for the first time in the Fall of 2009 and then taught it again in the Spring of 2010 and Fall of 2010.

Name: Garcia-Rios, Mario

Worked for more than 160 Hours: Yes

Contribution to Project:

Mario taught traditional General Chemistry in the Fall of 2008 and thus was very involved in the General Chemistry retention efforts. He taught a section of nutrition themed General Chemistry in the Fall of 2009. He did not receive any funding from the grant.

Name: Nolin, Katie

Worked for more than 160 Hours: Yes

Contribution to Project:

Dr. Nolin served as a co-research adviser for a Stonehill STEP program research student during the summer of 2009. She did not receive any funding from the grant.

Name: Medin, Carey

Worked for more than 160 Hours: Yes

Contribution to Project:

Dr. Medin served as a co-research adviser for a Stonehill STEP program research student during the summer of 2009. She did not receive any funding from the grant.

Name: Hall, Marilena

Worked for more than 160 Hours: Yes

Contribution to Project:

Taught a section of nutrition themed General Chemistry in the Fall of 2008. Developed and taught medical themed General Chemistry in the Falls of 2009 and 2010. Received a Course reduction but no monetary support.

She has supervised STEP summer research students almost every summer.

Name: Lombardi, Pamela

Worked for more than 160 Hours: Yes

Contribution to Project:

Taught a section of nutrition themed General Chemistry in the Falls of 2009 and 2010. Did not receive any additional compensation for teaching this theme-based course. Taught chemistry for the Summers of 2010 and 2011 Bridge Programs for which she received a \$3000 stipends.

Name: Gunawardena, Mevan

Worked for more than 160 Hours: Yes

Contribution to Project:

Dr. Gunawardena served as a research adviser for a Stonehill STEP program research student during the summer of 2010. He did not receive any funding from the grant.

Name: Bleakley, Bronwyn Heater

Worked for more than 160 Hours: Yes

Contribution to Project:

Supervised three STEP summer research students during the summer of 2011. She did not receive any compensation from the STEP grant.

Post-doc

Graduate Student

Undergraduate Student**Name:** Wong, Christina**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Stonehill College first-year summer research student in 2007. \$3500 for ten weeks of work plus \$300 for supplies. 2007 Stonehill College student mentor , stipend \$200

Name: Bonvini, Lindsay**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Stonehill College first-year summer research student in 2007. \$3500 for ten weeks of work plus \$300 for supplies.

Name: Delgado, Karol**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Stonehill College first-year summer research student in 2007. \$3500 for ten weeks of work plus \$300 for supplies.

Name: Cherney, Irene**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Massasoit Community College summer research student. No compensation, worked as a volunteer during summer of 2007. Received a \$3500 stipend during summer of 2008.

Name: Joseph, Stesha**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Massasoit Community College summer research student in 2007. \$3500 for ten weeks of work plus \$300 for supplies.

Name: Phillips, Moriah**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Massasoit Community College summer research student in 2007. \$3500 for ten weeks of work plus \$300 for supplies.

Name: Godek, Mark**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Massasoit Community College summer research student in 2007. \$3500 for ten weeks of work plus \$300 for supplies.

Name: Medeiros, John**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Massasoit Community College summer research student in 2007. \$3500 for ten weeks of work plus \$300 for supplies.

Name: Tanger, Pricilla**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Upper class student mentor for both 2007 and 2008 Summer Bridge Programs. Received \$900 each year for the three week programs.

Name: Taylor, Sabrina**Worked for more than 160 Hours:** No**Contribution to Project:**Upper class student Summer 2007 Bridge Program mentor. \$900 for the three week program.
Fall 2007 first-year General Chemistry student mentor. \$200 stipend**Name:** Whitaker, Katie

Worked for more than 160 Hours: No

Contribution to Project:

Upper class student Summer 2007 Bridge Program mentor. \$900 for the three week program.
Fall 2007 first-year General Chemistry student mentor. \$200 stipend.

Name: Lajoie, Ashley

Worked for more than 160 Hours: Yes

Contribution to Project:

Fall 2006 first-year General Chemistry student mentor for which she received a \$300 stipend.

Chemistry tutor at Massasoit Community College during the 2006/2007 academic year for which she received \$1393

Chemistry tutor at Massasoit Community College during the 2007/2008 academic year for which she received \$1548.

Chemistry tutor at Massasoit Community College during the 2008/2009 academic year and the summer of 2009 for which she received \$3218.

Name: Gilbert, Christina

Worked for more than 160 Hours: No

Contribution to Project:

Fall 2006 first-year General Chemistry student mentor. \$300 stipend

Name: Martin, Melissa

Worked for more than 160 Hours: No

Contribution to Project:

Fall 2006 first-year General Chemistry student mentor. \$300 stipend

Name: Torres, Lynes

Worked for more than 160 Hours: Yes

Contribution to Project:

Fall 2006 first-year General Chemistry student mentor. \$300 stipend

Chemistry Tutor at Massasoit Community College during the 2007/2008 academic year for which she received \$1498.

Name: Walsh, Emily

Worked for more than 160 Hours: No

Contribution to Project:

Fall 2006 first-year General Chemistry student mentor. \$300 stipend

Name: Liu, Annie

Worked for more than 160 Hours: No

Contribution to Project:

Chemistry tutor at Massasoit Community College during the 2006/2007 academic year for which she received \$465

Name: Cassell, Maura

Worked for more than 160 Hours: No

Contribution to Project:

Chemistry tutor at Massasoit Community College during the 2006/2007 academic year for which she received \$200

Name: Meagher, Matthew

Worked for more than 160 Hours: Yes

Contribution to Project:

Chemistry tutor at Massasoit Community College during the 2007 Summer for which he received \$1808

Name: Dogal, Natalie

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry. (Fall 2007--stipend of \$200)

Name: Dubois, Lily Nicole

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry. (Fall 2007--stipend of \$200)

Name: Gomes, Candinho

Worked for more than 160 Hours: Yes

Contribution to Project:

Stonehill College first-year summer research student in 2008. \$3500 for ten weeks of work plus \$300 for supplies.

Name: Nguyen, Oanh

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College summer research student in 2008. \$3500 for ten weeks of work plus \$300 for supplies.

Name: Benjamino, Jacquelynn

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College summer research student in 2008. \$3500 for ten weeks of work plus \$300 for supplies.

Helped plan mentoring and advising events at Massasoit Community College during the 2008/2009 academic year for which she received \$90.

Name: Locke, Patricia

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College summer research student in 2008. \$3500 for ten weeks of work plus \$300 for supplies.

Name: Tallmadge, Evan

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry (Fall 2007--stipend of \$200, Fall 2008 -- stipend of \$200, Fall 2009 -- stipend of \$200).

Name: Coletti, Matthew

Worked for more than 160 Hours: Yes

Contribution to Project:

2007 Summer Bridge Program participant. Received room and board for three weeks plus \$300 book store credit from this grant. Upper class student mentor for 2008 Summer Bridge Program. Received \$900 stipend for the three week program.

Name: Charlesworth, David

Worked for more than 160 Hours: No

Contribution to Project:

2007 Summer Bridge Program participant. Received room and board for three weeks plus \$300 book store credit from this grant.

Name: Chirichella, Justine

Worked for more than 160 Hours: No

Contribution to Project:

2007 Summer Bridge Program participant. Received room and board for three weeks plus \$300 book store credit from this grant.

Name: Constant, Brad

Worked for more than 160 Hours: No

Contribution to Project:

2007 Summer Bridge Program participant. Received room and board for three weeks plus \$300 book store credit from this grant.

Stonehill student mentor for students in General Chemistry (Fall 2008 -- stipend of \$200).

Name: DeCormier, Jacqueline

Worked for more than 160 Hours: No

Contribution to Project:

2007 Summer Bridge Program participant. Received room and board for three weeks plus \$300 book store credit from this grant.

Name: Garland, Ian

Worked for more than 160 Hours: No

Contribution to Project:

2007 Summer Bridge Program participant. Received room and board for three weeks plus \$300 book store credit from this grant.

Name: Holloran, Meaghan

Worked for more than 160 Hours: No

Contribution to Project:

2007 Summer Bridge Program participant. Received room and board for three weeks plus \$300 book store credit from this grant.

Stonehill student mentor for students in General Chemistry (Fall 2008 -- stipend of \$200, Fall 2009 -- stipend of \$200).

Name: Karr, Bailey

Worked for more than 160 Hours: No

Contribution to Project:

2007 Summer Bridge Program participant. Received room and board for three weeks plus \$300 book store credit from this grant.

Stonehill student mentor for students in General Chemistry (Fall 2008 -- stipend of \$200, Fall 2009 -- stipend of \$200).

Name: Miller, Karen

Worked for more than 160 Hours: No

Contribution to Project:

2007 Summer Bridge Program participant. Received room and board for three weeks plus \$300 book store credit from this grant.

Name: Records, Richelle

Worked for more than 160 Hours: No

Contribution to Project:

2007 Summer Bridge Program participant. Received room and board for three weeks plus \$300 book store credit from this grant.

Name: Ryan, Caitlin

Worked for more than 160 Hours: No

Contribution to Project:

2007 Summer Bridge Program participant. Received room and board for three weeks plus \$300 book store credit from this grant.

Name: Salisbury, Kathleen

Worked for more than 160 Hours: No

Contribution to Project:

2007 Summer Bridge Program participant. Received room and board for three weeks plus \$300 book store credit from this grant.

Stonehill student mentor for students in General Chemistry (Fall 2008 -- stipend of \$200).

Name: Sylvia, Krystin

Worked for more than 160 Hours: No

Contribution to Project:

2007 Summer Bridge Program participant. Received room and board for three weeks plus \$300 book store credit from this grant.

Name: Weavil, Victoria

Worked for more than 160 Hours: No

Contribution to Project:

2007 Summer Bridge Program participant. Received room and board for three weeks plus \$300 book store credit from this grant.

Name: Starkey, Charlene

Worked for more than 160 Hours: No

Contribution to Project:

2008 Summer Bridge Program participant. Received room and board for three weeks plus \$250 bookstore credit from this grant.

Name: Dwyer, Christine

Worked for more than 160 Hours: No

Contribution to Project:

2008 Summer Bridge Program participant. Received room and board for three weeks plus \$250 bookstore credit from this grant.

Name: Tentler, David

Worked for more than 160 Hours: No

Contribution to Project:

2008 Summer Bridge Program participant. Received room and board for three weeks plus \$250 bookstore credit from this grant.

Name: Tangney, Ryne

Worked for more than 160 Hours: No

Contribution to Project:

2008 Summer Bridge Program participant. Received room and board for three weeks plus \$250 bookstore credit from this grant.

Name: Karafotias, Elisabeth

Worked for more than 160 Hours: No

Contribution to Project:

2008 Summer Bridge Program participant. Received room and board for three weeks plus \$250 bookstore credit from this grant.

Upper class mentor for three week long 2009 Summer Bridge Program for which she received a \$900 stipend.

Name: Lemoine, Andrea

Worked for more than 160 Hours: Yes

Contribution to Project:

2008 Summer Bridge Program participant. Received room and board for three weeks plus \$250 bookstore credit from this grant.

Summer of 2009 undergraduate research participant for which she received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Lopes, Fabrizio

Worked for more than 160 Hours: Yes

Contribution to Project:

2008 Summer Bridge Program participant. Received room and board for three weeks plus \$250 bookstore credit from this grant.

Summer of 2009 undergraduate research participant for which he received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Genovese, Jacqueline

Worked for more than 160 Hours: No

Contribution to Project:

2008 Summer Bridge Program participant. Received room and board for three weeks plus \$250 bookstore credit from this grant.

Stonehill student mentor for students in General Chemistry (Fall 2009 -- stipend of \$200).

Name: Grenon, Kayleigh

Worked for more than 160 Hours: No

Contribution to Project:

2008 Summer Bridge Program participant. Received room and board for three weeks plus \$250 bookstore credit from this grant.

Name: Springford, Thomas

Worked for more than 160 Hours: No

Contribution to Project:

2008 Summer Bridge Program participant. Received room and board for three weeks plus \$250 bookstore credit from this grant.

Name: Shahid, Asad

Worked for more than 160 Hours: Yes

Contribution to Project:

2008 Summer Bridge Program participant. Received room and board for three weeks plus \$250 bookstore credit from this grant.

Summer of 2009 undergraduate research participant for which he received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Upper class mentor for the three week long 2009, and 2011 Summer Bridge Programs for which he received stipends of \$900.

Name: Corning, Sean

Worked for more than 160 Hours: No

Contribution to Project:

2008 Summer Bridge Program participant. Received room and board for three weeks plus \$250 bookstore credit from this grant.

Mentor for students taking General Chemistry in the Fall of 2009 for which he received a stipend of \$200.

Name: Devlin, Michael

Worked for more than 160 Hours: No

Contribution to Project:

2008 Summer Bridge Program participant. Received room and board for three weeks plus \$250 bookstore credit from this grant.

Name: Nguyen, Kieu

Worked for more than 160 Hours: Yes

Contribution to Project:

2008 Summer Bridge Program participant. Received room and board for three weeks plus \$250 bookstore credit from this grant.

Summer of 2009 undergraduate research participant for which she received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Mandozza, Jonathan

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College student who volunteered to do research for 4.5 weeks during the summer of 2008.

Name: Yardley, Megan

Worked for more than 160 Hours: No

Contribution to Project:

Mentor for students taking General Chemistry in the Fall of 2008 for which she received a stipend of \$200.

Name: Colthart, Allison

Worked for more than 160 Hours: No

Contribution to Project:

Mentor for students taking General Chemistry in the Fall of 2008 for which she received a stipend of \$200.

Mentor for students taking General Chemistry in the Fall of 2009 for which she received a stipend of \$200.

Name: Jackson, Kristin

Worked for more than 160 Hours: No

Contribution to Project:

Mentor for students taking General Chemistry in the Fall of 2008 for which she received a stipend of \$200.

Mentor for students taking General Chemistry in the Fall of 2009 for which she received a stipend of \$200.

Name: Pace, Nicholas

Worked for more than 160 Hours: No

Contribution to Project:

Mentor for students taking General Chemistry in the Fall of 2008 for which he received a stipend of \$200.

Name: Black, Anthony

Worked for more than 160 Hours: No

Contribution to Project:

Mentor for students taking General Chemistry in the Fall of 2008 for which he received a stipend of \$200.

Name: Buckley, Elizabeth

Worked for more than 160 Hours: No

Contribution to Project:

Mentor for students taking General Chemistry in the Fall of 2008 for which she received a stipend of \$200.

Name: Eno, Meredith

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry (Fall 2008 -- stipend of \$200, Fall 2009 -- stipend of \$200).

Name: Fox, Brittany

Worked for more than 160 Hours: No

Contribution to Project:

Mentor for students taking General Chemistry in the Fall of 2008 for which she received a stipend of \$200.

Provided physics tutoring for at risk Stonehill College science students during the 2009/2010 academic year. She was paid \$166.

Name: Keylor, Michell

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry (Fall 2008 -- stipend of \$200, Fall 2009 -- stipend of \$200).

Name: Kopaczewski, Kara

Worked for more than 160 Hours: No

Contribution to Project:

Mentor for students taking General Chemistry in the Fall of 2008 for which she received a stipend of \$200.

Name: Martinez, Raul

Worked for more than 160 Hours: No

Contribution to Project:

Mentor for students taking General Chemistry in the Fall of 2008 for which he received a stipend of \$200.

Name: Martone, Chistina

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry (Fall 2008 -- stipend of \$200, Fall 2009 -- stipend of \$200).

Name: O'Brien, Jenna

Worked for more than 160 Hours: No

Contribution to Project:

Mentor for students taking General Chemistry in the Fall of 2008 for which she received a stipend of \$200.

Name: Dombrowski, Eric

Worked for more than 160 Hours: No

Contribution to Project:

Tutored chemistry at Massasoit Community College during the 2008/2009 academic year for which he received \$1250.

Name: Ju, Lyssa

Worked for more than 160 Hours: Yes

Contribution to Project:

Summer of 2009 Stonehill College undergraduate research participant for which she received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Stonehill student mentor for students in General Chemistry (Fall 2009 -- stipend of \$200).

Name: Khubchandani, Jasmine

Worked for more than 160 Hours: Yes

Contribution to Project:

Summer of 2009 Stonehill College undergraduate research participant for which she received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Provided chemistry tutoring for at risk Stonehill College science students during the 2009/2010 academic year. She was paid \$174.

Name: Mir, Anum

Worked for more than 160 Hours: Yes

Contribution to Project:

Summer of 2009 Stonehill College undergraduate research participant for which she received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Bochetti, David

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College Summer of 2009 undergraduate research participant for which he received a stipend of \$3382 for 10 weeks of work plus \$300 for supplies.

Name: Corkey, Kyle

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College Summer of 2009 undergraduate research participant for which he received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Lurie, Robert

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College Summer of 2009 undergraduate research participant for which he received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Chavre, James

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College Summer of 2009 undergraduate research participant for which he received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Louis, Benito

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College Summer of 2009 undergraduate research participant for which he received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Steinmetz, Steven

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College Summer of 2009 undergraduate research participant for which he received a stipend of \$3465 for 10 weeks of work plus \$300 for supplies.

Name: Mikush, Elisabeth

Worked for more than 160 Hours: No

Contribution to Project:

2009 Summer Bridge Program Participant. She received food and housing for the three weeks of the program and a \$200 bookstore credit towards her text books.

Name: Miranda, Eliseo

Worked for more than 160 Hours: Yes

Contribution to Project:

2009 Summer Bridge Program Participant. He received food and housing for the three weeks of the program and a \$200 bookstore credit towards his text books.

Summer of 2010 undergraduate research participant for which he received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Monahan, Alexis

Worked for more than 160 Hours: No

Contribution to Project:

2009 Summer Bridge Program Participant. She received food and housing for the three weeks of the program and a \$200 bookstore credit towards her text books.

Name: Palmisano, Emily

Worked for more than 160 Hours: No

Contribution to Project:

2009 Summer Bridge Program Participant. She received food and housing for the three weeks of the program and a \$200 bookstore credit towards her text books.

Name: Perera, Christina

Worked for more than 160 Hours: No

Contribution to Project:

2009 Summer Bridge Program Participant. She received food and housing for the three weeks of the program and a \$200 bookstore credit towards her text books.

Name: Saint-Jean, Michelange

Worked for more than 160 Hours: No

Contribution to Project:

2009 Summer Bridge Program Participant. He received food and housing for the three weeks of the program and a \$200 bookstore credit towards his text books.

Name: Walsh, Kelly

Worked for more than 160 Hours: No

Contribution to Project:

2009 Summer Bridge Program Participant. She received food and housing for the three weeks of the program and a \$200 bookstore credit towards her text books.

Upper class mentor for the three week long 2010 Summer Bridge Program for which she received a stipend of \$900.

Name: Hanlon, Molly

Worked for more than 160 Hours: No

Contribution to Project:

2009 Summer Bridge Program Participant. She received food and housing for the three weeks of the program and a \$200 bookstore credit towards her text books.

Name: Hemphill, Christopher

Worked for more than 160 Hours: No

Contribution to Project:

2009 Summer Bridge Program Participant. He received food and housing for the three weeks of the program and a \$200 bookstore credit towards his text books.

Name: Marquis, Paige

Worked for more than 160 Hours: No

Contribution to Project:

2009 Summer Bridge Program Participant. She received food and housing for the three weeks of the program and a \$200 bookstore credit towards her text books.

Name: Melendez-Rios, Carola

Worked for more than 160 Hours: Yes

Contribution to Project:

2009 Summer Bridge Program Participant. She received food and housing for the three weeks of the program and a \$200 bookstore credit towards her text books.

Summer of 2010 undergraduate research participant for which she received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Bouzan, Lindsay

Worked for more than 160 Hours: No

Contribution to Project:

2009 Summer Bridge Program Participant. She received food and housing for the three weeks of the program and a \$200 bookstore credit towards her text books.

Name: Chalmers, Jennifer

Worked for more than 160 Hours: No

Contribution to Project:

2009 Summer Bridge Program Participant. She received food and housing for the three weeks of the program and a \$200 bookstore credit towards her text books.

Name: Cobb, Erin

Worked for more than 160 Hours: No

Contribution to Project:

2009 Summer Bridge Program Participant. She received food and housing for the three weeks of the program and a \$200 bookstore credit towards her text books.

Name: Donahue, Brendan

Worked for more than 160 Hours: No

Contribution to Project:

2009 Summer Bridge Program Participant. He received food and housing for the three weeks of the program and a \$200 bookstore credit towards his text books.

Name: Engel, Lauren

Worked for more than 160 Hours: No

Contribution to Project:

2009 Summer Bridge Program Participant. She received food and housing for the three weeks of the program and a \$200 bookstore credit towards her text books.

Name: Fenney, Nora

Worked for more than 160 Hours: No

Contribution to Project:

2009 Summer Bridge Program Participant. She received food and housing for the three weeks of the program and a \$200 bookstore credit towards her text books.

Name: Gray, Colin

Worked for more than 160 Hours: No

Contribution to Project:

2009 Summer Bridge Program Participant. He received food and housing for the three weeks of the program and a \$200 bookstore credit towards his text books.

Upper class mentor for the three week long 2010 Summer Bridge Program for which he received a stipend of \$900.

Name: Kelly, Chistopher

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry. (Fall 2007--stipend of \$200)

Name: Sweeney, Samantha

Worked for more than 160 Hours: Yes

Contribution to Project:

Stonehill College summer of 2010 undergraduate research participant for which he received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Newell, Ryan

Worked for more than 160 Hours: Yes

Contribution to Project:

Stonehill College summer of 2010 undergraduate research participant for which he received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Hill, Patrick

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College summer of 2010 undergraduate research participant for which he received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Whitney, Amanda

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College summer of 2010 undergraduate research participant for which he received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Bevis, Jennifer

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College summer of 2010 undergraduate research participant for which he received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Celino, Brian

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College summer of 2010 undergraduate research participant for which he received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Pollino, Michael

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College summer of 2010 undergraduate research participant for which he received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: McManus, Sean

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College summer of 2010 undergraduate research participant for which he received a stipend of \$3500 for 10 weeks of work plus \$300 for supplies.

Name: Boyle, Holly

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry (Fall 2009 -- stipend of \$200).

Name: Curtis, Hilary

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry (Fall 2009 -- stipend of \$200).

Name: Daly, Michael

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry (Fall 2009 -- stipend of \$200).

Name: Ferranini, Maura

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry (Fall 2009 -- stipend of \$200).

Name: Marchand, Derek

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry (Fall 2009 -- stipend of \$200).

Name: Mealey, Stephanie

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry (Fall 2009 -- stipend of \$200).

Name: Mercadante, Michael

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry (Fall 2009 -- stipend of \$200).

Name: Nicotera, Emily

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry (Fall 2009 -- stipend of \$200).

Name: O'Toole, Katherine

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry (Fall 2009 -- stipend of \$200).

Name: Rose, Timothy

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry (Fall 2009 -- stipend of \$200).

Name: Rubanow, Morgan

Worked for more than 160 Hours: No

Contribution to Project:

Stonehill student mentor for students in General Chemistry (Fall 2009 -- stipend of \$200).

Name: Nowd, Peter

Worked for more than 160 Hours: Yes

Contribution to Project:

Chemistry tutor at Massasoit Community College during the 2007/2008 academic year for which he received \$1640.

Name: Sheehan, Maggie

Worked for more than 160 Hours: No

Contribution to Project:

Chemistry tutor at Massasoit Community College during the 2009/2010 academic year for which she received \$1100

Name: Long, Jamie

Worked for more than 160 Hours: No

Contribution to Project:

Provided calculus tutoring for at risk Stonehill College science students during the 2009/2010 academic year. She was paid \$174.

Name: Germain, Nicholas

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: O'Day, Daniel

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Goselin, Ryan

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Hansen, Katherine

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Ferreira, Kamisha

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Rosa, Roberto

Worked for more than 160 Hours: Yes

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Summer of 2011 research student for which he received a stipend of \$3500.

Name: Gasbarro, Philip

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Lai, Jonathan

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Vailonis, Kristina

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Leising, Rebecca

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Libranda, Liane Rae

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Soivillen, Sandrine

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: DeFrancesco, Joseph

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Saintil, Herby

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Zezze, Ernest

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Clift, Sarah

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Paparian, Mekala

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Dwyer, Sean

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Keith, Megan

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Wong, Allyssa

Worked for more than 160 Hours: Yes

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Summer of 2011 research student for which she received a \$3500 stipend

Name: Granjean, Alexandra

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Albrecht, Jillian

Worked for more than 160 Hours: No

Contribution to Project:

2010 Summer Bridge Program Participant. The student received food and housing for the three weeks of the program and a \$200 bookstore credit towards textbooks.

Name: Joseph, Johnny

Worked for more than 160 Hours: Yes

Contribution to Project:

Participated in STEP research program during the summer of 2011.

Name: Etherson, Shannon

Worked for more than 160 Hours: Yes

Contribution to Project:

Participated in STEP research program during the summer of 2011

Name: Hedges, Janayna

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College summer 2011 research participant

Name: Taguezem, G. Florent

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College summer 2011 research participant

Name: Estabrook, Zoe

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College summer 2011 research participant

Name: Vieira, Andreia

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College summer 2011 research participant

Name: Hathaway, Jordan

Worked for more than 160 Hours: Yes

Contribution to Project:

Massasoit Community College summer 2011 research participant

Name: Goodrich, James

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Staley, Nicholas

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: McDonough, Meghan

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Murphy, Brittany

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Crete, Katherine

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Vautrinot, Kevin

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Marell, Ashely

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Rogers, Lillian

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Figueiredo, Lisa

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Randall, Ryan

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Thomas, Michael

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Maguy, Kristina

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Cooney, Jeffrey

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: McDonnell, Kayleigh

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Gendron, Ashley

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Buonopane, Sarah

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Walker, Colin

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Hill, Gabrielle

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Battinelli, Gina

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: McCarthy, Mei-Lei

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Schneider, Olivia

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Masters, Kathleen

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Noah, Thomas

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Name: Nurse, Natasha

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2011 Science Bridge Program Participant, received a \$200 book stipend

Technician, Programmer

Other Participant

Name: Upton, Deborah

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2007 Bridge Program mathematics instructor. \$3000 for three weeks of intense instruction.

Name: Martelli, Susan

Worked for more than 160 Hours: No

Contribution to Project:

Summer 2007 Bridge Program writing instructor. \$3000 for three weeks of intense instruction.

Name: Esty, Norah

Worked for more than 160 Hours: No

Contribution to Project:

Dr. Esty provided math instruction for three week summer bridge program during the summers of 2008 and 2010 for which she received a \$3000 stipend for each summer.

Name: Scheible, Ellen

Worked for more than 160 Hours: No

Contribution to Project:

Dr. Scheible provided english/writing instruction three week summer bridge program in 2008 and 2009. Received a \$3000 stipend each summer

Name: Dacey, Stephen

Worked for more than 160 Hours: No

Contribution to Project:

Instructed the Advanced Placement biology laboratories for area high school students on Saturdays at Stonehill College. During the 2007/2008 academic year he received a \$5,500 stipend, during the 2008/2009 academic year he received a \$4800 stipend, and during the 2009/2010 academic year he received \$3300.

Name: Levasseur, Christopher

Worked for more than 160 Hours: No

Contribution to Project:

Instructed the Advanced Placement chemistry laboratories for area high school students on Saturdays at Stonehill College. During the 2007/2008 academic year he received a \$ 9,000 stipend, during the 2008/2009 academic year he received a \$4725 stipend, and during the 2009/2010 academic year he received a \$5500 stipend.

Name: Su, Hsin-hao

Worked for more than 160 Hours: No

Contribution to Project:

Taught mathematics for the Summer Bridge Program for the summers of 2009 and 2011 for which he received \$3000 stipends.

Name: Woodcock, Tim

Worked for more than 160 Hours: No

Contribution to Project:

Taught mathematics during the summer of 2011 bridge program for which he received a \$3000 stipend.

Name: Opitz, Andrea

Worked for more than 160 Hours: No

Contribution to Project:

Taught writing/English during the 2010 and 2011 summer bridge programs for which she received stipends of \$3000.

Research Experience for Undergraduates

Organizational Partners

Massasoit Community College

Other Collaborators or Contacts

Stonehill's Admissions Office, Financial Aid Office, Office of Academic Achievement, and Office of Intercultural Affairs have been collaborating in recruiting and retaining more science students particularly students from backgrounds that are under represented in the sciences.

Activities and Findings

Research and Education Activities: (See PDF version submitted by PI at the end of the report)

Findings: (See PDF version submitted by PI at the end of the report)

Training and Development:

The undergraduate students who were participant in the early research initiative of the project learned following skills and experiences. Which of these exact skills the students learned depend on the particular research group with which the students were working.

1) Reading, understanding and adapting the primary literature

2) Synthetic organic chemistry techniques including running reactions under inert atmosphere, purifying solvents and reagents, running reactions under cryogenic and reflux conditions, working up reactions, and both scaling reaction up and scaling them down, chromatographic techniques including flash chromatography, and thin layer chromatography and NMR Spectroscopic analysis utilizing both one dimensional and two dimensional proton and carbon NMR.

- 3) Molecular biology and genetics techniques including preparation of media and solutions, sterile technique, microscopic manipulation and propagation of the nematode *C. elegans*, conducting genetic crosses of *C. elegans*, isolating genomic DNA, polymerase chain reaction (PCR) and agarose gel electrophoresis.
- 4) Analytical Chemistry skills and techniques including pipetting, using volumetric glassware, solution preparation, pH measurements, kinetic data analysis using excel, use of Winwedge software purification of reagents by crystallization, titration and spectrophotometry
- 5) The importance of maintaining an accurate laboratory notebook
- 6) Collaborative work experience by being part of a research group all working on sub-parts of a larger project.
- 7) Scientific writing experience by writing formal research reports
- 8) Scientific presentation experience through both internal (at Stonehill College) and external poster presentation.
- 9) Develop and hone critical and analytical skills to collect and analyze data, draw conclusions based on results, plan future experiments, and trouble shoot problems as they arise.

Outreach Activities:

We have been running Advance Placement Chemistry and Biology laboratories for area high school students at Stonehill College on Saturdays. Please see the Activities section above.

Journal Publications

Truong-Bolduc, QC; Bolduc, GR; Okumura, R; Celino, B; Bevis, J; Liao, CH; Hooper, DC, "Implication of the NorB Efflux Pump in the Adaptation of *Staphylococcus aureus* to Growth at Acid pH and in Resistance to Moxifloxacin", *ANTIMICROBIAL AGENTS AND CHEMOTHERAPY*, p. 3214, vol. 55, (2011). Published, 10.1128/AAC.00289-1

Anzivino, B; Tilley, LJ; Ingalls, LR; Hall, AB; Drugan, JE, "Got a Match? Ion Extraction GC-MS Characterization of Accelerants Adsorbed in Charcoal Using Negative Pressure Dynamic Headspace Concentration", *JOURNAL OF CHEMICAL EDUCATION*, p. 55, vol. 86, (2009). Published,

Books or Other One-time Publications

Web/Internet Site

URL(s):

<http://www.stonehill.edu/x8025.xml>

Description:

This site is the PI's website and provides a link that will allow one to access the original proposal, materials generated while executing the grant and evaluation materials

Other Specific Products

Contributions

Contributions within Discipline:

Contributions to Other Disciplines:

Contributions to Human Resource Development:

This project so far has trained 49 undergraduate students, 19 from Stonehill College and 30 from Massasoit Community College, in advanced research concepts and techniques in both chemistry and biology. The first Stonehill students have now graduated with degrees in biochemistry, biology and neuroscience while the remainder are continuing in their majors of chemistry, biology, biochemistry, physics and neuroscience. Sixteen of the community college students have transferred to four year-science degrees programs. They are attending or graduated from Stonehill, Utica College, Bridgewater State College, Northeastern University, Columbia University, Massachusetts College of Pharmacy, the University of Massachusetts Amherst, and the University of Massachusetts Boston. One community college student has entered a radiology program. Five of the six remaining community college students are continuing their science education at Massasoit Community College until they have completed their associates degrees. At which point, they hope to transfer to four-year degree programs. One student has completed a nuclear medical technology program at Massasoit Community College.

The enrollment of first-year students in the first chemistry course at Stonehill increased by 18 students or 24% from the Fall of 2005 to the Fall of 2006, stayed exactly the same from the Fall of 2006 to the Fall of 2007, increased by two students between Fall of 2007 and 2008, by 44 students from the Fall of 2008 to the Fall of 2009, and by 16 students from the Fall of 2009 to the Fall of 2010. That means there has been a 107% increase in the number of first year students enrolled in General Chemistry since the Fall of 2005, prior to any grant activities. In addition, the first-year to second-year retention rate for science students has increased from 56% for the class of 2009, to 69% for the class of 2010 to 77% for the class of 2011 to 78% for the classes of 2012 and 2013. The increased enrollment and decreased attrition will potentially provide 165 more B.S. science graduates over four graduating classes (2010-2013) compared to the number of graduates if the enrollment and attrition numbers had stayed static.

Contributions to Resources for Research and Education:

Contributions Beyond Science and Engineering:

Conference Proceedings

Special Requirements

Special reporting requirements: None

Change in Objectives or Scope: None

Animal, Human Subjects, Biohazards: None

Categories for which nothing is reported:

Any Book

Any Product

Contributions: To Any within Discipline

Contributions: To Any Other Disciplines

Contributions: To Any Resources for Research and Education

Contributions: To Any Beyond Science and Engineering

Any Conference

MASSASOIT COMMUNITY COLLEGE-STONEHILL COLLEGE

TRANSFER CREDIT ARTICULATION AGREEMENT

COURSE EQUIVALENCY GUIDE FOR SCIENCE MAJORS

FALL 2007

The following Transfer Credit Articulation Agreement has been designed to assist Massasoit Community College students interested in pursuing a Bachelor's degree in Biology, Biochemistry, Chemistry (AB and BS) and Neuroscience at Stonehill College. The agreement was drawn up in consultation with the Science and Mathematics Division of Massasoit Community College.

The impetus of this articulation agreement was a Science, Technology, Engineering and Mathematics Talent Expansion Program (STEP) grant from the National Science Foundation (Grant #DUE-0622540). One initiative of the STEP Program is to increase the number of Massasoit Community College students who transfer to any four-year science program.

If students complete all Massasoit Community College and SACHEM courses for a particular major, as recommended on the following Articulation Documents, they will be able to transfer as juniors within that major at Stonehill College. Completing the specified Massasoit Community College courses does not guarantee admission to Stonehill College. Students must still comply with all Stonehill College admission requirements and credit transfer policies.

Every attempt has been made to ensure the accuracy of this document. However, curriculum and academic policies are always subject to change. Final determination of a student's credit acceptance will be made at the time of admission to Stonehill College. This document constitutes the entire agreement and supersedes any prior discussions and/or negotiations. This Articulation Agreement shall commence on the date all parties have signed this Agreement. This Articulation Agreement may be terminated by either party for any reason upon written notice to the other with at least one semester notice prior to the effective date of termination. This agreement is not assignable and may not be amended, revised, or modified, except in writing executed by all parties.

Biochemistry Major Articulation Document

Massasoit Course (Stonehill Equivalent)

1. Biol 101 -- Biological Principles (BI 101 – Biological Principles I)
2. Biol 102 – Biology of Organisms (BI 101 – Biological Principles II)
3. Biol 231 – Microbiology (BI 309 – Microbiology)
4. SACHEM Exchange BI 211 – Cell Biology at Stonehill College

5. Chem 151 – General Chemistry I (CH 113 – General Chemistry)
6. Chem 152 – General Chemistry II (CH 231 – Intro. Physical and Analytical Chemistry)
7. Chem 201 – Organic Chemistry I (CH 221 – Organic Chemistry I)
8. Chem 202 – Organic Chemistry II (CH 222 – Organic Chemistry II)

9. Phys 161 – General Physics I (PY 121 – Physics I)
10. Phys 262 – General Physics II (PY 122 – Physics II)

11. Math 221 – Calculus I (MA 125 – Calculus I)
12. Math 222 – Calculus II (MA 126 – Calculus II)

13. Engl 101 – English Composition I (GL 100 -- Critical Encounters – Literature)
14. Engl 102 – English Composition II (Free Elective)

15. Foreign Language I (Foreign Language I)
16. Foreign Language II (Foreign Language II)

17. Hist 101 – History of Western Civilization I (GH 100 – Critical Encounters – History)
or
Hist 103 -- United States History I (GH 100 – Critical Encounters – History)
18. Hist 102 – History of Western Civilization II (Free Elective)
or
Hist 104 – United States History II (Free Elective)

19. Phil 101 – Introduction to Philosophy (GP 100 – Critical Encounters – Philosophy)

20. Relg 101 – Intro. to World Religions (GR 100 – Critical Encounters – Religious Studies)

Still Required at Stonehill College

Natural Scientific Inquiry

Statistical Reasoning

Learning Community (requires three courses unless LC 209 *Organic Chemistry of the Cell* for which Cell Biology (BI 211) and Organic Chemistry II (Chem 202) are the other two courses)

Moral Reasoning

Social Scientific Inquiry

Genetics (BI 202)

Analytical Chemistry (CH 331)

Physical Chemistry I (CH 333)

Biochemistry I (BC 343)

Biochemistry II (BC 344)

Biochemistry Laboratory (BC 345)

Biochemistry Seminar and Thesis (BC 449)

Independent Research (BC 496) or Internship in Biochemistry (BC 475)

400 Level Chemistry or Biology Course

Up to four to six Free Electives depending on selection of Learning Community

Biology Major Articulation Document

Massasoit Course (Stonehill Equivalent)

1. Biol 101 -- Biological Principles (BI 101 – Biological Principles I)
2. Biol 102 – Biology of Organisms (BI 101 – Biological Principles II)
3. Biol 231 – Microbiology (BI 309 – Microbiology)
4. SACHEM Exchange BI 211 – Cell Biology at Stonehill College

5. Chem 151 – General Chemistry I (CH 113 – General Chemistry)
6. Chem 152 – General Chemistry II (CH 231 – Intro. Physical and Analytical Chemistry)
7. Chem 201 – Organic Chemistry I (CH 221 – Organic Chemistry I)
8. Chem 202 – Organic Chemistry II (CH 222 – Organic Chemistry II)

9. Phys 151 – College Physics I (PY 201 – Basic Physics I)
or
Phys 161 – General Physics I (PY 121 – Physics I)

10. Math 221 – Calculus I (MA 123 – Calculus for Biology I)
11. Math 222 – Calculus II (MA 124 – Calculus for Biology II)
12. Math 131 – Introduction to Statistics (Statistical Reasoning Requirement)

13. Engl 101 – English Composition I (GL 100 -- Critical Encounters – Literature)
14. Engl 102 – English Composition II (Free Elective)

15. Foreign Language I (Foreign Language I)
16. Foreign Language II (Foreign Language II)

17. Hist 101 – History of Western Civilization I (GH 100 – Critical Encounters – History)
or
Hist 103 -- United States History I (GH 100 – Critical Encounters – History)
18. Hist 102 – History of Western Civilization II (Free Elective)
or
Hist 104 – United States History II (Free Elective)

19. Phil 101 – Introduction to Philosophy (GP 100 – Critical Encounters – Philosophy)

20. Relg 101 – Intro. to World Religions (GR 100 – Critical Encounters – Religious Studies)

Still Required at Stonehill College

Natural Scientific Inquiry

Learning Community (requires three courses unless LC 209 *Organic Chemistry of the Cell* for which Cell Biology (BI 211) and Organic Chemistry II (Chem 202) are the other two courses)

Moral Reasoning

Social Scientific Inquiry

Genetics (BI 202)

Evolution (BI 323)

Ecology (BI 307) or Botany (BI 303) or Marine Ecosystems (BI 305)

2 x Organismic Biology Course

Upper Level Biology Course

Senior Capstone

Up to seven to nine Free Electives depending on selection of Learning Community

AB Chemistry Major Articulation Document

Massasoit Course (Stonehill Equivalent)

1. Chem 151 – General Chemistry I (CH 113 – General Chemistry)
2. Chem 152 – General Chemistry II (CH 231 – Intro. Physical and Analytical Chemistry)
3. Chem 201 – Organic Chemistry I (CH 221 – Organic Chemistry I)
4. Chem 202 – Organic Chemistry II (CH 222 – Organic Chemistry II)

5. Phys 161 – General Physics I (PY 121 – Physics I)
6. Phys 162 – General Physics II (PY 122 – Physics II)

7. Math 221 – Calculus I (MA 125 – Calculus I)
8. Math 222 – Calculus II (MA 126 – Calculus II)
9. Math 131 – Introduction to Statistics (Statistical Reasoning Requirement)

10. Engl 101 – English Composition I (GL 100 -- Critical Encounters – Literature)
11. Engl 102 – English Composition II (Free Elective)

12. Foreign Language I (Foreign Language I)
13. Foreign Language II (Foreign Language II)

14. Hist 101 – History of Western Civilization I (GH 100 – Critical Encounters – History)
or
Hist 103 -- United States History I (GH 100 – Critical Encounters – History)
15. Hist 102 – History of Western Civilization II (Free Elective)
or
Hist 104 – United States History II (Free Elective)

16. Phil 101 – Introduction to Philosophy (GP 100 – Critical Encounters – Philosophy)

17. Relg 101 – Intro. to World Religions (GR 100 – Critical Encounters – Religious Studies)

18. Free Elective*
19. Free Elective*
20. Free Elective*

* It is strongly suggested that at least one of the Massasoit Free Electives is a SACHEM course taken at Stonehill College that will meet a Stonehill general education requirement (*i.e.* Natural Scientific Inquiry or Social Scientific Inquiry).

Still Required at Stonehill College

Learning Community (requires three courses)

Moral Reasoning

Natural Scientific Inquiry

Social Scientific Inquiry

Analytical Chemistry (CH 331)

Physical Chemistry I (CH 333)

3 x 300 or 400 Level Chemistry Courses

Seminar and Thesis (CH 449)

Up to eight to nine Free Electives depending on Free Electives taken at Massasoit*

BS Chemistry Major Articulation Document

Massasoit Course (Stonehill Equivalent)

1. Chem 151 – General Chemistry I (CH 113 – General Chemistry)
2. Chem 152 – General Chemistry II (CH 231 – Intro. Physical and Analytical Chemistry)
3. Chem 201 – Organic Chemistry I (CH 221 – Organic Chemistry I)
4. Chem 202 – Organic Chemistry II (CH 222 – Organic Chemistry II)

5. Phys 161 – General Physics I (PY 121 – Physics I)
6. Phys 162 – General Physics II (PY 122 – Physics II)
7. SACHEM Exchange PY 221 – Physics III at Stonehill College

8. Math 221 – Calculus I (MA 125 – Calculus I)
9. Math 222 – Calculus II (MA 126 – Calculus II)
10. Math 223 – Calculus III (MA 261 – Calculus III)
11. SACHEM Exchange MA 262 – Calculus IV – Differential Equations at Stonehill College

12. SACHEM Exchange LC 235 – Integrated Seminar – Quantum Waves at Stonehill College

13. Engl 101 – English Composition I (GL 100 -- Critical Encounters – Literature)
14. Engl 102 – English Composition II (Free Elective)

15. Foreign Language I (Foreign Language I)
16. Foreign Language II (Foreign Language II)

17. Hist 101 – History of Western Civilization I (GH 100 – Critical Encounters – History)
or
Hist 103 -- United States History I (GH 100 – Critical Encounters – History)
18. Hist 102 – History of Western Civilization II (Free Elective)
or
Hist 104 – United States History II (Free Elective)

19. Phil 101 – Introduction to Philosophy (GP 100 – Critical Encounters – Philosophy)

20. Relg 101 – Intro. to World Religions (GR 100 – Critical Encounters – Religious Studies)

Still Required at Stonehill College

Statistical Reasoning
Moral Reasoning
Natural Scientific Inquiry
Social Scientific Inquiry
Analytical Chemistry (CH 331)
Physical Chemistry I (CH 333)
Physical Chemistry II (CH 334)
Advanced Analytical Chemistry (CH 432)
Instrumental Analysis Theory and Practice (CH 442)
Atomic Structure and Spectra (CH 443)
Advanced Organic Chemistry (CH 435)
Advanced Inorganic Chemistry (CH 444)
Seminar and Thesis (CH 449)
Up to seven Free Electives

Neuroscience Major Articulation Document

Massasoit Course (Stonehill Equivalent)

1. Biol 101 -- Biological Principles (BI 101 – Biological Principles I)
2. Biol 102 – Biology of Organisms (BI 101 – Biological Principles II)
3. SACHEM Exchange BI 211 – Cell Biology at Stonehill College

4. Chem 151 – General Chemistry I (CH 113 – General Chemistry)
5. Chem 152 – General Chemistry II (CH 231 – Intro. Physical and Analytical Chemistry)
6. Chem 201 – Organic Chemistry I (CH 221 – Organic Chemistry I)

7. Psyc 101 -- General Psychology (PC 101 – General Psychology)
8. Psyc 102 – Child Psychology (PC 201 – Developmental Psychology I)
or
Psyc 201 – Abnormal Psychology (PC 207 – Abnormal Psychology)

9. Engl 101 – English Composition I (GL 100 -- Critical Encounters – Literature)
10. Engl 102 – English Composition II (Free Elective)

11. Foreign Language I (Foreign Language I)
12. Foreign Language II (Foreign Language II)

13. Hist 101 – History of Western Civilization I (GH 100 – Critical Encounters – History)
or
Hist 103 -- United States History I (GH 100 – Critical Encounters – History)
14. Hist 102 – History of Western Civilization II (Free Elective)
or
Hist 104 – United States History II (Free Elective)

15. Phil 101 – Introduction to Philosophy (GP 100 – Critical Encounters – Philosophy)

16. Relg 101 – Intro. to World Religions (GR 100 – Critical Encounters – Religious Studies)

17. Free Elective *
18. Free Elective *
19. Free Elective *
20. Free Elective *

* It is strongly suggested that at least one of the Massasoit Free Electives is a SACHEM course taken at Stonehill College that will meet a Stonehill general education requirement (*i.e.* Natural Scientific Inquiry or Social Scientific Inquiry).

Still Required at Stonehill College

Natural Scientific Inquiry
Introduction to Statistics (PC 261)
Learning Community (requires three courses)
Moral Reasoning
Social Scientific Inquiry
Genetics (BI 202)
Research Methods in Psychology (PC 271)
Brain and Behavior (PC 415)
Neuroscience (BI 412)
Cluster 1 elective
Cluster 2 elective
Cluster 3 elective
Up to six to seven Free Electives depending on Free Electives taken at Massasoit*

Initiative #1 -- Theme-Based Chemistry:

During the Fall of 2006, Magda Pederson, Leon Tilley, Louis Liotta, and Kendra Twomey '98 (Massasoit) met first to discuss the topics that need to be covered in the theme-based General Chemistry courses and later to share information and ideas on how to cover these topics in a general chemistry course. Although the group planned to meet biweekly the meetings were approximately monthly. The three Stonehill faculty involved in this project were each given a single course release to allow them the time they needed to search out and examine appropriate materials. During the Spring of 2007, Magda and Leon started developing and testing materials needed for the food and nutrition-, and the forensics-based General Chemistry courses, respectively. Magda and Leon each received a one-course reduction during the spring semester to allow for this new course development. These new General Chemistry sections were first offered in the Fall of 2007. Magda's section met on Wednesdays and Fridays from 9:30 a.m. to 12:30 p.m. and Leon's section met on Wednesdays and Fridays from 2:30 p.m. to 5:30 p.m. There was no distinction between lecture and laboratory for these two sections. Two rooms were scheduled simultaneously for each section, S011 (a classroom) and S103 (the General Chemistry laboratory), thus allowing for seamless transition between an experimental format and a lecture type format.

The number of meetings during the course development period was fewer than originally planned. This was not because there wasn't a need for such meetings but because there was not time for such meetings. In addition, the theme-based courses were not transferred to Massasoit until the Fall of 2008 because Kendra was on leave from March until the end of the semester and unable to be fully involved in the development of the courses.

In the Fall of 2007, two sections of Theme-Based General Chemistry were offered at Stonehill College. One section, taught by Magda Pederson, used Food and Nutrition as the theme. The second section, taught by Leon Tilley, used Forensics as the theme. Returning students were free to pre-register for one of these two theme-based sections or one of two traditional sections. Nine of these students pre-registered for a theme-based section and ten pre-registered for a traditional section. Entering first-year students pre-registered for General Chemistry without specifying a particular section. These students were then sent an email describing the different formats under which the General Chemistry would be taught. They were asked to provide us their preference if they had one for either one of the Theme-Based sections or for the traditional format. Of the 104 entering first-year students who had pre-registered for General Chemistry, 26 indicated a preference for a Theme-Based section and 13 chose traditional sections. Every effort was made to give these students their preference. The remaining 65 students were randomly assigned sections. Because of students placing out of General Chemistry based on advanced placement test scores, deciding to go to other colleges or changing their planned major, by the start of the Fall semester, the number of first-year students in General Chemistry had dropped to 93. A total of 23 students were in the nutrition-based section, 24 in the forensic-based section and 65 in the traditional sections. Of the 47 students in the Theme-Based sections 12 were non-science majors compared to only eight students out the 65 in the traditional General Chemistry sections.

The final exams for all sections of General Chemistry had a few common questions in order to assess differences in student learning between the Theme-Based and traditional General Chemistry formats. Final grades and first to second semester retention rates were compared for students in the two different types of General Chemistry. In addition, student course evaluation responses were also used to compare the two approaches.

In the Spring of 2008, both the forensics- and nutrition-themed General Chemistry sections received approval from the Stonehill's General Education Committee to satisfy the College's Natural Scientific Inquiry requirement. Thus starting in the 2008/2009 academic year non-science students have an added incentive to take these courses since they count towards their degree requirements and if in the process, they become interested in pursuing a science major they are not as far behind because they would already have General Chemistry completed. In the Fall of 2008, the Director of General Education decided that

the approval for these two theme-based sections of General Chemistry would be applied to all theme-based General Chemistry courses regardless of the specific theme.

During the 2007/2008 academic year Kendra Twomey worked on the development of a Theme-Based General Chemistry based on a nutrition theme which was offered in the Fall of 2008 at Massasoit Community College. In addition, a second section of nutrition-themed General Chemistry was offered at Stonehill College in the Fall of 2008. This additional section was taught by Marilena Hall. The two sections of nutrition-themed General Chemistry were incorporated into a pilot initiative to introduce first-year seminar courses into the curriculum at Stonehill. As a result, the sections were limited to 16 students, instead of 25, Marilena and Magda also served as the faculty advisor to the students in their sections, and there was an increase in the amount of writing required of the students in these sections compared to other sections. After orientation, in June of 2008, there were 103 first-year students registered for General Chemistry. By the start of the fall semester, for the reason stated above, that number of students had dropped to 96 first-years students in General Chemistry. The distribution of those students was 20 in the forensic themed section, 29 in food and nutrition themed sections (two section as first-year seminars), and 46 in traditional sections (two sections).

In the Spring of 2008, Cheryl Schnitzer was given a one course reduction to start converting her non-majors Environmental Chemistry course into an Environmental-themed General Chemistry course. She had another reduction in the Fall of 2008 with a planned launch in the Fall of 2009.

During the summer of 2009, Stonehill College's new science center opened. This building included laboratories specifically designed for the theme-based General Chemistry courses. The plan for the Fall of 2009 was to offer only theme-based General Chemistry (six sections). In the Spring of 2009, we set up the schedule such that two of the sections would be 16-student first-year seminar courses and four of the sections would be 24 students each. Thus 128 students could be accommodated in General Chemistry. After first-year orientation in June, 185 students were registered for General Chemistry (155 first-year students and 30 returning students). This compares to 123 students (103 first year students and 20 returning students) in June of 2008. Because of these extra students two additional sections of theme-based General Chemistry were added and the 16-student first-year seminars were converted to normal 24-student sections. Thus in the Fall of 2009 eight sections theme-based General Chemistry each accommodating 24 students were offered. The themes were as follows: forensics (two sections), food and nutrition (three sections), medicine (one section), art (one section), and environmental (one section). Both forensic sections were taught by Leon Tilley, the food and nutrition sections by Mario Garcia-Rios, Pamela Lombardi, and Magdalena Pederson, the medicine section by Marilena Hall, the art section by Maria Curtin, and the environmental section by Cheryl Schnitzer. By end of add/drop this past fall semester, for the reason stated above, that number of students had dropped to 139 first-years students in General Chemistry.

For the first time, one section of General Chemistry was offered in during the spring semester. This was an environmental themed section taught by Cheryl Schnitzer. By offering this course during the spring students who either dropped the course during the fall or made a decision to pursue science a little late would only be a semester behind in their chemistry courses instead of an entire year. These students could catch up by taking a single summer course instead having to take two summer courses. Eight students enrolled in this Spring General Chemistry course, 1 senior, 3 sophomores and 4 first-year students.

Based on the number of students taking General Chemistry in the Fall of 2009, the Department of Chemistry planned to offer eight sections (each 24 students) of themed-based General Chemistry in the Fall of 2010. This would accommodate 192 students in General Chemistry. At the end of the drop/add period, there were 180 students taking General Chemistry. As was the case in 2009, all eight sections of General Chemistry are theme-based (two sections each of forensics, medicine, and food and nutrition, as well as one section of art and one section of environmental). The Chemistry faculty later found out that

this 41 students increase over the fall of 2009 was the result of the lower admissions standards at the college. The College places incoming students in one of eight categories based on their predicted academic performance. One being those expected to do the best and eight being those expected to have the most difficult. Forty-three percent of the class entering in 2010 were in the bottom two categories while typically it is in the low thirty percent range. As a result, a result many students were under prepared for the level of work expected for first-year students at Stonehill. This was an issue across the College not just in the sciences. Because faculty members only learned of this change in admissions standards towards the end of the fall semester, they were not prepared to work with the student deficiencies in a timely manner.

The Department planned to offer eight section of theme-based General Chemistry in the Fall of 2011, with the capacity to accommodate 192 students in General Chemistry. However after orientation in June the number of students requesting General Chemistry was less than anticipated so only seven sections are actually being offered (two sections each of forensics, medicine, and food and nutrition and one section of art). At the end of the drop/add period, there were 147 students taking General Chemistry. Indications from the Office of Admissions are that the admissions standards have been returned to their historic level and that only 30% of the class is from the bottom two categories.

Initiative #2 -- Early Research Experiences:

Upon discussion with Stonehill's Dean of Admissions, Brian Murphy, during the Fall of 2006 the Department decided that the Stonehill STEP summer research scholarships would be for rising sophomores (students between their first and second years at the College). For the summer of 2007, the students would be selected from among those taking first-year chemistry courses. The summer 2008 scholarships would be offered to class of 2011 students as part of their admission's packages with the condition that they have to maintain a certain GPA during their first year. If the students who are offered these scholarships decide not to attend Stonehill then students from the first-year chemistry courses would be selected to receive the scholarship.

In early March of 2007, four Class of 2010 students were selected to receive STEP Summer of 2007 research scholarships. These students were Christina Wong (BC 2010), Lindsay Bonvini (BI 2010), Karol Delgado (NS 2010) and Candinho Gomes (NS 2010). The students' research scholarships were conditional on the students maintaining C or better averages both overall and in their science courses. One of the students did not have the required C average in the student's science courses and therefore was not eligible for the scholarship. The Department decided to hold the scholarship until the Summer of 2008 again conditional on the student having a C average both overall and in science. Initially three faculty members agreed to mentor these students in research (Louis Liotta – two students, Maria Curtin – one student, and Jane De Luca – one student). However after the students heard about the different faculty members' research, two were interested in working with Maria and two with Jane. Maria and Jane both agreed to take an extra student. Thus two students were to work with Maria and two with Jane. As mentioned above one student could not participate in the program this summer, thus leaving Maria with just one student. The four scholarships for class of 2011 students to do research during the Summer of 2008 were offered to four ALANA students late in the admissions process. These prospective students were sent award letters and the Admissions Office staff contacted them by telephone.

Since none of the ALANA students offered summer research scholarships decided to attend Stonehill and since the number of ALANA science students in the class of 2011 was very low in general, three out of 93 students, the science faculty decided to take a much more active role in recruiting ALANA science students to the class of 2012. Eighty-four ALANA students were accepted into the science program for the class of 2012. All of these students were sent a letter from Magda Pederson congratulating them on their acceptance telling them about the STEP grant initiatives. In addition, a brochure about the STEP grant initiatives was included with the letter. The letter was followed by a telephone call to each student from either Magda Pederson or Marie Turner. The top eighteen African, Latino or Native American

accepted science students were offered research scholarships with the hope of having four of them come to Stonehill. These scholarships were discussed during the phone call with the students.

Since there were so few ALANA science students in the class of 2011 and since the Department of Chemistry faculty did not identify any non ALANA students that fit the profile described in the original proposal for the summer research scholarships for the summer of 2008, only one student was identified as a possible candidate for the summer research funding. However, he did not maintain an adequate GPA to qualify for the program. He was informed that the research scholarship would be held for him until the summer of 2009 if he raised both his science and overall GPAs to at least 2.0. The three remaining summer research scholarships were saved for the summer of 2009 to be awarded to class of 2012 students. The student who was supposed to have a research scholarship for the Summer of 2007 but did not have a 2.0 or better science GPA improved his/her science GPA during his/her sophomore year, raising it above the required 2.0. As a result the student was granted the summer research scholarship that was held from the previous year. During the summer of 2008, the student worked with Maria Curtin's research team.

The science faculty followed a strategy similar to what they used for the class of 2012 when recruiting ALANA students to the class of 2013. One hundred three ALANA students were accepted into the science program for the class of 2013. All the students were sent letters from Magda Pederson congratulating them on their acceptance and telling them about the STEP grant initiatives. A brochure about the STEP grant initiatives was included with the letter. The letter was followed by a phone call to each student from either Magda Pederson or Mario Garcia-Rios. The top seven African, Latino or Native American accepted science students were offered research scholarships for the summer after their first year, conditional on maintaining a specified GPA. In addition, this year the college received a S-STEM grant from the NSF to provide scholarship money to students from groups under represented in the sciences. Fifteen of the 103 ALANA students were offered S-STEM scholarships.

Since the class of 2012 had a substantial number of ALANA students and since no summer research scholarships were given in the Summer of 2008, to the class of 2011, eight summer research scholarships were offered to class of 2012 students. The student who was supposed to have a research scholarship for the summer of 2008 but did not have a 2.0 or better science GPA did not improve his science GPA during his sophomore year and thus lost the opportunity to receive the fellowship. The eight students offered Summer of 2009 research scholarships were Lyssa Ju, Jasmine Khubchandani, Randy Jose, Fabrizio Lopes, Asad Shahid, Kieu Nguyen, Andrea Lemoine, and Anum Mir. One of the students did not have the required GPA in the sciences and therefore was not eligible for the scholarship. The faculty decided to hold the scholarship for this student until the Summer of 2010. Seven faculty members (Louis Liotta, Leon Tilley, Marilena Hall, Magda Pederson, Maria Curtin, Katie Nolin, and Carey Medin) accepted STEP summer research scholars into their groups.

The science faculty again followed a strategy similar to what they used for the classes of 2012 and 2013 when recruiting ALANA students to the classes of 2014 and 2015. There were 162 ALANA students accepted into the science program for the class of 2014 and 160 ALANA students in the class of 2015. The parents of all the students were sent letters and the students themselves sent an email from Magda Pederson congratulating them on their acceptance and telling them about the STEP grant initiatives. A brochure about the STEP grant initiatives was included with the letter. The letter was followed by a phone call to each student from Magda Pederson, Cheryl Schnitzer or Pamela Lombardi. For the class of 2014, the top eight African, Latino or Native American accepted science students were offered research scholarships for the summer after their first year, conditional on maintaining a specified GPA. These summer research fellowships were not offered to any class of 2015 students because funding for the fellowships will have expired. As was the case for the class of 2013, the College also had S-STEM scholarship money to offer to students from groups under

represented in the sciences. Thirteen of the 162 ALANA students were offered S-STEM scholarships in 2010 and thirteen of the 160 ALANA students were offered S-STEM scholarships in 2011.

During the spring semester of 2010, five summer research scholarships were offered to class of 2013 students. The student who was suppose to have a research scholarship for the summer of 2009 but did not have a 2.0 or better science GPA did not improved his science GPA during his sophomore year and thus lost the opportunity to receive the fellowship. The five students offered Summer of 2010 research scholarships were Samantha Sweeney, Ryan Newell, Carola Melendez-Rios, Amber Hubbard, and Eliseo Miranda. One of the students did not have the required GPA in the sciences and therefore was not eligible for the scholarship. The faculty decided to hold the scholarship for this student until the Summer of 2011. Three faculty members (Louis Liotta, Marilena Hall, and Mevan Gunawardena) accepted STEP summer research scholars into their groups. Mevan Gunawardena is a new faculty member in Physics and this is the first time that members of the Physics Department have participated in the program.

During the spring semester of 2011, five students class of 2014 students were offered summer research fellowships. The student who did not have the required GPA to receive a research fellowship in the Summer of 2010 still did not have a high enough GPA in the Spring of 2011 so was not offered a fellowship for the Summer of 2011. The five students offered research fellowships were Johnny Joseph, Roberto Rosa, Sage Carlson, Shannon Etherson, and Allyssa Wong. For financial reasons, one of the students, Sage Carlson, decided to leave Stonehill after the end of the spring semester. Thus she was not able to receive the research fellowship. This decision was made too late in the spring to allow for replacement student to be selected. Instead the faculty decided to offer the fellowship to a student in the summer of 2012. Two faculty members (Louis Liotta and Heather Bleakley) accepted STEP summer research scholars. Heather Bleakley is a new faculty member in the Biology Department.

After some discussion during the 06/07 academic year with Kendra Twomey and Bill Hanna from Massasoit, we decided that Kendra would collaborate with Louis Liotta on research for the Summer of 2007 and that Bill would collaborate with Craig Almeida. Five Massasoit students along with Kendra and Bill did research at Stonehill during the Summer of 2007. Working with Kendra were Irene Cherney, Stesha Joseph, and Moriah Phillips while the students working with Bill were Mark Godek and John Medeiros. Although the grant only funds four students there were five working because one volunteered. Irene Cherney's visa did not permit her to work in the United States so she worked as a volunteer.

Bill Hanna did not return to do research during the Summer of 2008. In his place, Rachel Hirst, a new biology faculty member at Massasoit Community College and a Stonehill College graduate, collaborated with Magda Pederson. In addition to Rachel, two Massasoit students also joined this team, Jacquelynn Benjamino and Patricia Locke. Kendra again collaborated with Louis Liotta. Irene Cherny who volunteered during the summer of 2008 had obtained permanent residency so returned for a second summer this time receiving a stipend for the work. In addition, Oanh Nguyen from Massasoit also joined the Liotta/Twomey team as the second research scholarship recipient. Jonathan Mandozza a fifth Massasoit student volunteered for part of the summer doing research with the Liotta/Twomey team. He had prior commitments for the second half of the program so could not fully participate as a research scholarship recipient.

During the summer of 2009, three Massasoit Community College faculty and six students participated in research at Stonehill College. Two of the faculty were returning faculty (Kendra Twomey and Rachel Hirst. In addition, there was one new chemistry faculty member (Vasumathi Desikan). Kendra again worked with Louis Liotta but under a reduced schedule due to maternity leave. Two Massasoit students worked on the Twomey/Liotta team, Robert Lurie and Kyle Corkery. Rachel along with two students (Steven Steinmetz and David Bocchetti) collaborated with Magda Pederson. Vasumathi and her two students (James Chavre and Benito Louis) worked on an independent project

with some guidance from Leon Tilley. In fact, the Stonehill student that was suppose to work with Leon (Asad Shahid) actually worked with Vasu and her students instead. A second biology faculty member from Massasoit and two additional students that were budgeted for the Summer of 2009 were saved for the Summer of 2010 since a suitable faculty member could not be found. A new biology faculty member with and interest in research was hire starting the 2009/2010 academic year.

During the summer of 2010, three Massasoit Community College faculty and six students participated in research at Stonehill College. Two of the faculty were returning faculty (Vasumathi Desikan and Rachel Hirst). In addition, there was one new biology faculty member (Gilles Bolduc). Kendra Twomey who in the past three summers worked with Louis Liotta has exhausted her three years of funding under this grant and spent the summer obtaining supplies and equipment necessary to transfer the research effort to Massasoit Community College. The supply and equipment purchases were funded under this grant up to \$15,000. Rachel along with two students (Patrick Hill and Amanda Whithey) collaborated with Magda Pederson. Rachel also started purchasing the equipment and supplies needed to transfer research back to Massasoit Community College. Vasumathi and her two students (Sean McManus and Michael Pollino) collaborated with Maria Curtin. The new biology faculty member, Gilles Bolduc, did not collaborate with any of the Stonehill faculty. Instead he worked with his two students (Jennifer Bevis and Brian Celino) on is own research project. They worked in close proximity to Marilena Hall's research group and the Pederson/Hirst research group so that they could quickly learn what facilities and resources were available at Stonehill.

During the summer of 2011, the NSF-STEP grant summer research funding involving Massasoit Community College was supplemented by funding from the Lloyd G. Balfour Foundation. The combined funding allow for eight Massasoit students, four Massasoit faculty members and four upper-level Stonehill students to do research. The role of the Stonehill students was serve as peer mentors for the Massasoit students. All four Massasoit faculty members have previously been involved in this project (Kendra Twomey, Rachel Hirst, Gilles Bolduc, and Vasumathi Desikan). Rachel along with two students (Yevgeniya Wright and Jordan Hathaway) collaborated with Magda Pederson. Vasumathi and her two students (Alaba Oluwadara and Janayna Hedges) collaborated with Maria Curtin. Kendra and her two students (Andreia Vieira and Jessica MyClymont) collaborated with Louis Liotta. The new biology faculty member, Gilles Bolduc, did not collaborate with any of the Stonehill faculty. Instead he worked with his two students (G. Florent Taguezem and Zoe Estabrooks) on is own research project. In addition, four upper-class Stonehill students worked on research and served as mentors and guides for the Massasoit students. Two of these students were STEP research scholars during the summer of 2010 (Ryan Newell and Carola Melendez-Rio). Two of these students were new research students (Sarah Stumper and Dino Bukvic).

All research students complete evaluations to assess the impact of the research experience.

Initiative #3 -- Enhanced Mentoring, Tutoring and Advising:

In August 2006 Louis met separately with Deans Richard Grant (Academic Services) and Brian Murphy (Admissions) to discuss the STEP grant initiatives, specifically the plans for a student-mentoring program for the first-year students. The purpose of these talks was to discuss how the Department, the Offices of Academic Services and Admissions could best work together to improve retention of science majors.

On the day before the start of the 2006 Fall Semester, a meeting was held to recruit mentors for the student-mentoring program. All sophomore through senior Chemistry and Biochemistry majors and minors as well as a few Biology majors were invited to this meeting. The students were informed of the grant award and of the multiple opportunities, including mentoring, by which they could become involved in the project. Students interested in mentoring were asked to apply for the positions. Five students, Ashley Lajoie (BC), Christina Gilbert (BI), Melissa Martin (BI), Lynes Torres (BC), Emily Walsh (BI) were chosen to serve as mentors during the 2006/2007 academic year. Early in the fall semester, Magda Pederson attended Massachusetts Mentoring Partnership's "Mentoring from A-Z" workshops. After the

workshop Magda discussed our needs with the Partnership and scheduled a customized “Mentoring 101” workshop for the first group of mentors. From among the 93 students in the class of 2010 who were pre-registered for General Chemistry, the Admissions staff identified 32 students they thought would most benefit from a mentoring program. Magda invited those 32 students to participate in the mentoring program and matched each of them with one of the five upper-class students who would serve as their mentors. The mentors also contacted the potential mentees informally inviting them to participate in the program.

Since mentoring seemed to have a positive impact on retention in the sciences of those students who participated in the program in the Fall of 2006, the program was expanded to all students in the Fall of 2007. In addition, mentoring was more closely tied to the academic aspects of the course; that is, advanced students who were already serving as leaders for General Chemistry Peer Led Team Learning (PLTL) groups were assigned the same students as their mentees. Thus these mentors had contact with the students more often in both academic and socially supportive settings. Seventeen advanced students were selected by the faculty to be PLTL leaders/mentors for the Fall of 2007. Each leader/mentor was assigned between six and eight General Chemistry students with whom to work. An evaluation was provided to the General Chemistry students at the end of the semester to obtain feedback on both their PLTL and mentoring experiences. Leader/mentors that received favorable evaluations and submitted a report listing their mentoring activities received a \$200 stipend in addition to their hourly rate of pay for being a PLTL leader. This process was repeated in the Fall of 2008, with 18 advanced students serving as PLTL leaders/mentors and in the Fall of 2009, with 23 advanced students serving as PLTL leaders/mentors. Since the PLTL leaders/mentors appear, for the most part, to be providing the mentoring as part of being a PLTL leader and since the students get paid by the College for the hours they put into being a PLTL leader, we decided that students would not receive an extra \$200 just for being a mentor. Instead of paying the mentors, the funds will be used to hire more individual student tutors. These additional student tutors are particularly needed because of the very large number of science students within their first two years of the major and because the recently accepted students have been noticeably weaker academically than previous classes.

Before the start of the 2006 Fall Semester, the faculty involved in the grant (Louis Liotta, Magda Pederson, Craig Almeida, Leon Tilley, and Maria Curtin) visited Massasoit Community College, met with the coordinator of their tutoring program, and took a tour of their tutoring center. During the Fall of 2006, two Stonehill Biochemistry majors (Ashley Lajoie and Annie Liu) provided a total of 107 hours of chemistry (also biology and math when needed) tutoring at Massasoit. During the Spring of 2007 a third tutor was added (Chemistry major Maura Cassell). A total of 99 hours of tutoring was provided during the spring semester. Since the budget of the NSF grant allowed for 448 hours of tutoring the first year of the grant and only 206 hours were used during the academic year, tutoring was also provided during the Summer of 2007 by Biology major Matthew Meagher. The program was continued in the 2007/2008 academic year. During the Fall of 2007 and Spring of 2008, two Biochemistry majors tutored at Massasoit (Ashley Lajoie and Lynes Torres). The program provided a total of 205 hours of tutoring during the fall semester and 99 hours during the spring semester. Although there was money available, no students could be found to provide tutoring over the Summer of 2008. During the 2008/2009 academic year and summer, tutoring at Massasoit was provided by Ashley Lajoie and Eric Dombroski. They provided a total of 447 hours of tutoring, 131 hours in the fall, 186 hours in the spring, and 130 hours during the summer. During the 2009/2010 academic year and summer, tutoring at Massasoit was provided by Peter Nowd and Maggie Sheehan. They provided a total of 274.5 hours of tutoring, 69 hours in the fall and 205.5 hours in the spring. During the 2010/2011 academic year tutoring at Massasoit was provided by Patrick Hill and Meredith Eno. They provided a total of 366 hours of tutoring over the academic year.

With the goal of setting up an articulation agreement that will allow Massasoit Community College students to transfer to Stonehill at the **Junior** level in Chemistry, Biology, Biochemistry, or Neuroscience, Louis Liotta reviewed the curriculum for each of these majors. Through a series of

discussions with the appropriate department chairs at Stonehill he ascertained which Massasoit courses would be equivalent to which Stonehill Courses. He then worked with the Office of Academic Services to determine the equivalency of General Education courses. With this information, he produced rough plans of what courses Massasoit students should complete if they want to transfer to Stonehill in one of the four science majors. These plans were refined through a series of meetings with Stonehill's Office of Academic Services and Massasoit's Transfer Office. On July 31, 2007, the top academic administrators of both colleges signed a formal articulation agreement.

During the 2008/2009 academic year, a concerted effort in advising and guiding Massasoit students towards transferring to four-year programs was initiated. This effort was led by Rachel Hirst with assistance from Melanie Trecek-King and Jacquelynn Benjamino. Activities included collecting student contact data from the students in introductory science courses, group advising sessions, matching of students interested in science transfer to appropriate advisors, providing information and training to faculty advisors, creation of a pamphlet on career options in science, hosting informational seminars for students (Massasoit summer research students, Massasoit science graduates, representatives from advisement and counseling on scholarship opportunities, and career scientist describing their career paths) and social events so students can meet both faculty and like minded students. These effort were repeated during both the 2009/2010 and 2010/2011 academic years.

Initiative #4 -- Summer Bridge Program:

During the spring semester of 2007 Magda Pederson and Louis Liotta started serious planning for the Science Summer Bridge Program. The Program ran from August 6 to August 24, 2007. Magda arranged housing for 15 students and three upper-level student mentors through Conference and Event Services, and meals through Sodexo. In consultation with Ed Sevilla (Director of Marketing), and the Admissions Office, Louis designed and produced a brochure promoting the Science Summer Bridge Program. He also set up a website describing the Program and providing a downloadable application (<http://www.stonehill.edu/chemistry/summer.htm>). The brochure was sent to all accepted students who indicated Chemistry, Biochemistry, Biology, Neuroscience, or Undeclared Science as their major. It was also sent to all students who pre-registered for General Chemistry even if they were not in one of the above majors. Based on the student response to the mentoring program and on conversations with other previous STEP recipients, the Department was concerned that the number of students applying to the Bridge Program would be low. To provide more incentive for students to apply, the awarding of a \$300 book stipend to every student completing the program was introduced. The deadline to apply for the program was set at June 25, with acceptances going out July 2, 2007. A total of 16 students applied for the Program. The Admissions staff assisted in selecting the participants by identifying the students who would most benefit from the Program. Fifteen students were accepted into the program but one of the 15 had to withdraw; therefore, fourteen students took part in the 2007 Science Summer Bridge Program.

The Program emphasized self-awareness, study skills, and learning strategies in "real life" learning situations, all while introducing students to key faculty, staff and services on campus that can help them succeed. The Bridge Program targeted mathematics, chemistry and writing. Debbie Upton taught the mathematics, and Susan Martelli taught writing skills. Magda Pederson oversaw the Program and taught the chemistry portion of the program. The three teaching assistants/team leaders/mentors for the program were Priscilla Tanger (Biochemistry '10), Sabrina Taylor (Neuroscience '08) and Katie Whitaker (Chemistry '08).

Bridge program participants completed a survey at the end of the summer evaluating the program. Based on SAT scores a comparison group of fourteen students was selected from the students taking General Chemistry in the Fall of 2007 to assess the impact of the Bridge Program. Two criteria were used when comparing the two groups of students: performance in General Chemistry and retention from first to second semester chemistry.

Two changes were made to the Summer of 2008 Bridge Program to better attract the target audience. These changes were made based on the responses of the students from the Class of 2011 gave for not applying to the program. In March of 2008, brochures were sent out to all accepted science ALANA students describing the many STEP grant initiatives including the dates of the Science Summer Bridge Program. In this way, these prospective students knew the dates of the Bridge Program two months earlier than students did the previous year. This should have better allowed them to plan their summer schedule around the Program if they are interested in attending. The second change was an offer by the College to add \$1000 in grant aid to any student who completed the Science Summer Bridge Program. This extra aid should somewhat alleviate the financial strain caused by the students not working for the three weeks of the Program. Other changes to the program included reducing the book stipend to \$250 to better match available funding and maintaining the same student rooms from the Bridge Program into the academic year to allow the cohort of students to continue and grow. In the Summer of 2007, Bridge Program participants moved to rooms all over campus with the start of the semester.

Brochures describing the Summer 2008 Science Bridge Program were mailed to all Class of 2012 students planning to attend Stonehill with majors in Chemistry, Biochemistry, Biology, Neuroscience, or Undeclared Science in early May. The deadline to apply for the program was set at June 30, with acceptances going out July 7, 2008. A total of 18 students applied for the Program. All eighteen students were accepted into the program. Between the acceptance date and the start of the Program, four students had to withdraw for various reasons; therefore, as was the case in 2007, fourteen students took part in the 2008 Science Summer Bridge Program. A matched group of students was selected based on high school class rank, SAT scores, high school GPA, and the Admissions Office rating of the difficulty of the students' high school curriculum. This group of students will be used for comparative purposes when evaluating the impact of the Bridge Program. In 2008, Norah Esty taught the mathematics and Ellen Scheible taught writing. The two teaching assistants/team leaders/mentors for the program were Priscilla Tanger (Biochemistry '10) and Matthew Coletti (Biology '11).

The changes made in the methods of recruiting of students to the 2008 Bridge Program resulted in more of the target students applying to the Program. For instance while 12% of the first-year science students participated in the Program, 25% of the first-year ALANA science students participated. Participation in the 2008 Bridge Program had a marked impact on the participants' grades in General Chemistry and in the tendency of the students to continue to second-semester chemistry compared to an academically matched control group. The General Chemistry GPA for Bridge Program participants was a 2.25 while the General Chemistry GPA for the comparison group was 2.07. Similarly the second semester chemistry retention rate for the Bridge Program students was 79% versus 57% for the comparison group.

The Summer 2009 Science Bridge Program was set up and administered similar to the 2008 program. Promotion was handled in a similar manner, the additional \$1000 financial aid was again offered to those completing the program, and the students were all housed in the same dorm during the Program as during the academic year. A total of 27 students applied for the program. Twenty-two students were accepted into the program. Of the 22 accepted students, 18 students actually participating in the program. An 18 student comparison group was selected from first-year science students by matching high school records and SAT scores with those student participating in the Bridge Program. Magda Pederson again oversaw the whole program and taught chemistry. Ellen Scheible taught writing, Hsin-hao Su taught mathematics and 2008 Bridge Program participants Asad Shahid and Elisabeth Krafotias served as the teaching assistants/team leaders/mentors.

The improvements in recruiting targeted students into the 2008 Bridge Program appear to have been not only retained but also improved upon when recruiting students for the 2009 Bridge Program. With larger applicant pool from which to select students, we did a better job of selecting students who were more in need of academic support. That is the 2009 Summer Bridge Program participants were academically weaker than either the 2007 or 2008 participants. Four of the 18 students (22%) of the

Bridge Program participants were ALANA students while only 15% of the first-year science students were ALANA students.

The Summer 2010 and Summer of 2011 Science Bridge Programs were set up and administered similar to the 2008 and 2009 programs. Promotion was handled in a similar manner, the additional \$1000 financial aid was again offered to those completing the program, and the students were all housed in the same dorm during the Program as during the academic year. In addition, participation in the Bridge Program was made a requirement for most of the students receiving S-STEM scholarships. Thirty-two students applied for the program in both 2010 and 2011. Twenty-two students were accepted into the program in 2010 and 24 students in 2011. In 2010, all of the accepted students actually participated in the program. In 2011, one student who was originally accepted into the program could not attend and an alternate was selected to replace her. In 2010, 22 students comparison group was selected from first-year science students by matching high school records and SAT scores with those student participating in the Bridge Program. A similar 24 students comparison group was selected in 2011. Both summers Magda Pederson oversaw the whole program; however, she did not teach chemistry in the program. In both 2010 and 2011, Andrea Opitz taught writing and Pamela Lombardi taught chemistry. In 2010, Norah Esty taught mathematics. The students were split based on ability in mathematics during the Summer of 2011 program. One of the mathematics course was taught by Tim Woodcock and one was taught by Hsin-hao Su.

Previous Bridge Program participants Kelly Walsh and Colin Gray served as the teaching assistants/team leaders/mentors in 2010, and Kristina Vailonis and Asad Shahid served as the teaching assistants/team leaders/mentors in 2011.

The method of recruiting continues to be successful. As was the case in 2009, we appear to do a better job each year of attracting the target audience to the program. With an even larger applicant pool than in 2009 from which to select students, we did a better job of selecting students who were more in need of academic support. That is the 2010 and 2011 Summer Bridge Program participants were academically weaker than participants from previous years. In 2010, seven of the 22 students (32%) of the Bridge Program participants were ALANA students while only 8.5% of the first-year science students were ALANA students. In 2011, four of the 24 students (16.5%) of the Bridge Program participants were ALANA students while only 7.2% of the first-year science students were ALANA students.

Initiative #5 -- Career Exploration:

The 2008 Science Summer Bridge Program participants visited Bureau Veritas and Siemens and the 2009 Program participants visited Genzyme and Acceleron/Pharma. During these visits, they toured the facilities, listen to presentations on the type of work done at the location and learned what type of educational background is necessary for jobs in these fields. A Massasoit Community College students (most of whom were thinking exclusively about the nursing program when entering the college) received pamphlets on career options that are possible with a four-year degree in the sciences. Massasoit hosted seminar speakers who specifically discussed what they currently are doing and their path to their career. In the Spring of 2009, the Stonehill College Chemistry and Biochemistry Clubs hosted a career night in which six guest, mostly Stonehill alumni, met with students over dinner and discussed their careers. The Department of Chemistry and the Biochemistry Program hosted six seminar speakers during the 2008/2009 academic year. These speakers discussed their work but also what is required to pursue a career in their particular field. The Biology Department hosted career and graduate school seminar speakers and two career nights, one dedicated to graduate and professional schools and one dedicated to careers in biology.

Career Exploration activities in the 2009/2010 and 2010/2011 academic years were basically identical to the activities during the previous academic year. The only exception is that Magda Pederson was

unable to set up a trip for the Bridge program participant to visit an industrial site. With the current economy fewer and fewer industrial facilities are willing to use employee time to give group tours.

Initiative #6 -- AP Chemistry and Biology Lab Enhancement:

Craig Almeida offered a number of area high schools the opportunity to take part in an Advanced Placement Laboratory program during the 2007/2008 academic year. Three high schools and a single student from a fourth high school participated in the program. Two of the high schools, Brockton (69% ALANA students) and Randolph (74% ALANA students), were from districts with great diversity and socio-economic need. The third high school was a local Catholic high school, Coyle Cassidy. One student from Middleboro High School heard about the program and asked to participate. This student was welcomed but bus transportation was not provided. Based on the needs of the schools, Craig determined that two sections of the AP Chemistry and one section of the AP Biology Laboratories would be offered on approximately every third Saturday from October until May. The original plan called for the biology to be offered at Massasoit Community College and the chemistry at Stonehill College but due to the lack of available laboratory space at Massasoit both the biology and the chemistry were taught at Stonehill. Craig arranged for bus transportation from the three high schools to Stonehill. Craig recruited two highly qualified high school teachers (Stephen Dacey and Chris Levasseur) to teach the laboratories. Both of these teachers are Stonehill College science graduates and they are both young and enthusiastic. Contact information was collected from the students to allow us to contact them in the future to measure the impact of the AP laboratories on their futures.

The AP Chemistry and Biology Laboratories were again offered during the 2008/2009, 2009/2010, and 2010/2011 academic years. Based on the experiences from the 2007/2008 academic year, the number of laboratory meetings was reduced from 12 to six for biology and ten for chemistry. Only students from Randolph and Brockton high schools participated in the 2008/2009 program. Contact, demographic, and survey data were collected from all the students. The two faculty members completed evaluations and the high schools provided the AP test scores of both the students who participated in the AP laboratory program and students who took the AP course at the high school but did not participate in the program.

Evaluation:

In addition to our continuous, ongoing internal evaluation, we had the over STEP grant program evaluated externally. Our external evaluator was Dr. Ronnie Halprin from Purchase College. She reviewed the data we have collected to date, evaluated and interpreted our survey instruments, visited Stonehill to conduct a number of focus group discussions and provide us with an evaluative report on our progress to date.

Sustainability:

Much discussion has gone into determining which initiatives of this project are of the most value to retaining students in the sciences and are therefore most worth sustaining after the grant funding has ended. Many discussions have also been held on how to sustain those initiatives deemed most worthwhile. A grant proposal has been submitted to the Balfour Foundation for funding to sustain the Massasoit Community College transfer initiative and the summer research initiative. Although the proposal was for three years it was only funded for one with the possibility of additional grants in the future. We are currently working on submitting a follow up proposal to this initial proposal. In addition a grant proposal was submitted to the Luminar Foundation. This proposal was not funded. The College has initiated a] summer bridge program for all majors designed after the Science Summer Bridge Program called the ACE (Academic Community Experience). In the future, the science students needing extra support will be included in this summer program. Students in the ACE program spend the three weeks prior to the start of the academic year living on campus and taking two courses. One course is a writing practicum for which they do not get academic credit. The other

is a General Education course in literature, history or religion. They receive three credits for the General Education. Although the science will not be receiving instruction in science or mathematics during this program receiving credit for the General Education course will allow them to take one fewer courses during the fall of their first year, thus allowing them more time to work on their science and mathematics courses. This ACE program is completely funded by the College.

Massasoit Community College has applied for and received a number of grants to strengthen their STEM offerings.

Initiative #1 -- Theme-Based Chemistry:

The table below provides the averages of the student responses on course evaluation questions pertaining to the course (questions specifically applying to the professor teaching the course are separate). The evaluations are on a one to five scale with one being strongly disagree and five being strongly agree. For 2007, these responses appear to indicate that students spent slightly more time outside of class on course work in the traditional sections than in the theme-based sections. In parallel, students in the traditional sections felt homework contributed more to their understanding than students in the theme-based sections did. On all other questions, responses favor the theme-based approach. Students in the theme-based sections participated more in class discussion, were more motivated to do their best, found the course more intellectually challenging, experienced a greater increase in their interest in the subject matter, felt the course better helped them to become critical thinkers, and felt that class discussions were more helpful in increasing their understanding.

Table 1. General Chemistry Results of Student Evaluations

	Fall 2007 Trad.	Fall 2007 Theme-based	Fall 2008 Trad.	Fall 2008 Theme-based	Fall 2009 Theme-based	Fall 2010 Theme-based
Hours spent weekly outside of class	5.04	4.90	3.90	4.90	5.64	5.16
Participated in class discussion	3.50	3.67	3.17	3.48	3.72	3.32
Motivated to do best	4.13	4.43	3.75	4.18	4.15	3.66
Intellectually challenging	4.39	4.62	4.18	4.56	4.50	3.91
Increased interest in the subject	3.57	3.81	2.95	3.22	3.41	3.00
Helped to become a critical thinker	3.95	4.14	3.42	3.62	3.81	3.30
Homework contributed to understanding	4.32	4.17	3.87	3.82	4.02	3.56
Class discussion helped with understanding	4.07	4.14	3.57	3.90	3.83	3.48

The 2008 evaluation data are similar except the average responses are generally lower in both the traditional and theme-based courses when compared to the 2007 results. The cause of this across the board difference between the two years has not been investigated, but the average and median grades in both the traditional and theme-based sections were lower as well. Thus the year-to-year lower evaluation results may be the result of somewhat weaker students. The college did have to go deep into its admissions waiting list to make the class of 2012. When comparing the responses from students in traditional General Chemistry to those in the theme-based with in a particular year, the only difference between the 2008 and the 2007 responses is in the area of hours spent outside of class. In 2007, the students in traditional General Chemistry reported spending more time outside of class than students in the theme-based sections. These results were reversed in 2008. Since only theme-based General Chemistry was offered in the Fall of 2009 there is no comparison group for that year. The data can only be compared to results from previous years. The results are for the most part slightly stronger than those from the Fall of 2008. The students spent more hours per week outside of class, participated more in class discussion, indicated that the course both increased their interest in the subject and helped them to become critical thinkers to a greater extent, and felt that the homework contributed more to their learning. The evaluation results for Fall of 2010 are weaker in almost all categories when compared to previous years with the exception of the Fall of 2008 traditional General Chemistry students. These results are clearly the result of the substantially under-prepared class of students admitted to the college in 2010. These types of result were observed across the College not just in the sciences. It is assumed that

the results would have even been worse if not for the changes made to the General Chemistry pedagogy.

As seen in the table below comparing the results from the traditional and theme-based sections from both the Fall of 2007 and the Fall of 2008, relating to common exam questions, the students in the theme-based sections may have a deeper conceptual knowledge of the material while the students both sections do equally well memorizing facts. The students performed the same on the common multiple choice problems while the student in the theme-based sections did noticeably better on the problems requiring explanations.

Table 2. General Chemistry Results from Common Exam Questions

	Multiple Choice		Problem & Explanation	
	Average	Median	Average	Median
Theme-Based (n=92)	72%	80%	84%	88%
Traditional (n=123)	73%	80%	72%	75%

A comparison of the average and median grades of the students in the two types of General Chemistry in 2007 indicates that the median grade is the same in both situations (a 3.0), but the average grade is higher in the case of the Theme-Based General Chemistry, 3.05 versus 2.90. In 2008, the average grades for two types of courses were the same (2.78 for the theme-based versus 2.76 for the traditional) while the median grade in the traditional General Chemistry (3.0) was higher than the median grade in the theme-based (2.7). When comparing first to second semester retention in chemistry, the theme-based sections seem to have a slightly higher retention rate than the traditional approach sections (81% versus 78% in 2007 and 84% versus 75% in 2008). The average General Chemistry grade in 2009 was 2.82 and the median was 3.0. The first to second semester retention rate was 76%. The average General Chemistry grade in 2010 was 2.60 and the median was 2.7. The first to second semester retention rate was 70%.

The table on the next page provides a summary of General Chemistry related materials that correspond to each theme that have been developed so far. The documents referred to in the table will be available on the Stonehill College STEP grant website once a couple of technical issues get worked out. In the meantime copies of documents can be obtained by sending an email request to the PI at liotta@stonehill.edu. This table will also be available on the website. As more documents are developed, they will be cataloged appropriately in the table and added to the website.

General Chemistry Concept	Type of Document Available	Theme	Title of Document
Scientific Method	Lecture Notes	Medicine	<i>Medical Example of the Scientific Method</i>
Properties of Matter	Experiment	Food & Nutrition	<i>How Dense is Soda?</i>
	Experiment	Food & Nutrition	<i>Intermolecular Attractions in Liquids (Corn Syrup, Spearmint Extract, and Cooking Oil)</i>
	Lecture Notes	Forensics	<i>Analysis and Identification of Glass</i>
	Experiment	Environmental	<i>Synthesis and Purification of Biodiesel</i>
	Experiment	Forensics	<i>Glass Density</i>
Measurements	Experiment	Food & Nutrition	<i>How Dense is Soda?</i>
	Lecture Notes	Forensics	<i>Analysis and Identification of Glass</i>
	Experiment	Forensics	<i>Glass Density</i>
	Lecture Notes	Medicine	<i>The "cc": Measurements of Volume</i>
Atomic Theory	Lecture Notes	Forensics	<i>Vanilla-Cocaine GCMS</i>
Elements and the Periodic Table	Activity	Medicine	<i>Elements in Medicine Student Presentations</i>
Molecules/Ions/Compounds	Experiment	Food & Nutrition	<i>Got Sugar? How Much?</i>
	Experiment	Forensics	<i>Case: Cyanide Poisoning</i>
	Experiment	Art	<i>Synthesis of Inorganic Pigments by Precipitation</i>
Molecular Mass	Experiment	Food & Nutrition	<i>Extraction and Identification of Organic Molecules from Orange Peels</i>
	Experiment	Food & Nutrition	<i>Microwave Popcorn: Should You Hold the Butter?</i>
	Exercise	Forensics	<i>What's in My Vanilla?</i>
	Lecture Notes	Forensics	<i>Vanilla-Cocaine GCMS</i>
	Experiment	Forensics	<i>Cocaine on Money?</i>
	Experiment	Forensics	<i>Arson Investigation</i>
	Experiment	Environmental	<i>Synthesis and Purification of Biodiesel</i>

Empirical/Molecular Formulas	Exercise	Forensics	<i>What's in My Vanilla?</i>
	Lecture Notes	Forensics	<i>Vanilla-Cocaine GCMS</i>
	Experiment	Forensics	<i>Cocaine on Money?</i>
Chemical Equations	Lecture Notes	Environmental	<i>Photosynthesis, Oxidation, and Combustion Reactions</i>
	Lecture Notes	Environmental	<i>Powerful oxidizing agents</i>
Stoichiometry/Limiting Reagents	Lecture Notes	Forensics	<i>Detection of Ethanol</i>
	Experiment	Forensics	<i>Determination of Ethanol by Chromate Oxidation</i>
Solution Chemistry/ Concentration	Experiment	Food & Nutrition	<i>Can One Apple Seed a Day, Put Your Teacher Away?</i>
	Experiment	Forensics	<i>Case: Cyanide Poisoning</i>
	Experiment	Environmental	<i>Pond Study</i>
Acid/Base Chemistry	Experiment	Food & Nutrition	<i>Which is More Acidic: Lemon Juice or Lime Juice?</i>
	Experiment	Food & Nutrition	<i>pH of Foods</i>
	Experiment	Forensics	<i>Quinine Titration</i>
	Lecture Notes	Forensics	<i>Acidic and Basic Drugs</i>
	Experiment	Medicine	<i>Acid-Base Titration of Aspirin</i>
	Experiment	Art	<i>Marble: Determination of Carbonate Ion in Sodium Carbonate by an Acid-Base Titration</i>
	Experiment	Environmental	<i>Soil pH</i>
Spectroscopy	Experiment	Food & Nutrition	<i>Food Dyes: What Wavelengths Do They Absorb?</i>
	Lecture Notes	Forensics	<i>Detection of Ethanol</i>
	Lecture Notes	Medicine	<i>Electromagnetic Spectrum and NMR and MRI</i>
	Experiment	Medicine	<i>Extraction of Vitamins A and C</i>
	Experiment	Art	<i>Visible Spectra of FD&C Dyes and Beer's Law</i>
Electron Configurations, Orbitals & Quantum Chemistry	Experiment	Food & Nutrition	<i>Atomic Spectra and the Analysis of Salt and Salt Substitutes</i>
	Lecture Notes	Environmental	<i>Climate Change: Electromagnetic- and Blackbody-Radiation</i>

Bonding	Experiment	Forensics	<i>Arson Investigation</i>
	Lecture Notes	Medicine	<i>Bonding in Medical Molecules from Student Presentations</i>
Lewis Structures & Resonance	Experiment	Forensics	<i>Arson Investigation</i>
Intermolecular Forces	Experiment	Food & Nutrition	<i>Intermolecular Attractions in Liquids (Corn Syrup, Spearmint Extract, and Cooking Oil)</i>
	Experiment	Forensics	<i>Arson Investigation</i>
	Lecture Notes	Environmental	<i>Intermolecular Forces: Properties of Water</i>
	Experiment	Medicine	<i>Extraction of Vitamins A and C</i>
Molecular Geometry			
Electronegativity			
Polarity			
Reaction Kinetics	Lecture Notes	Medicine	<i>Pharmacokinetics</i>
Chemical Equilibrium	Experiment	Forensics	<i>Quinine Titration</i>
Thermochemistry	Experiment	Medicine	<i>Cold Packs and Enthalpy of Solution</i>
	Lecture Notes	Environmental	<i>Climate Change: What Does it Mean to “Save Energy?”</i>
	Experiment	Environmental	<i>Combustion reactions: Food Energy</i>
Use of Chemical Literature	Activity	Forensics	<i>Ethanol Literature Search</i>
	Activity	Medicine	<i>Exploring the Chemical Literature Chemistry Article vs. JAMA</i>
	Activity	Environmental	<i>Analyzing “Environmental Science and Technology” papers</i>

Initiative #2 -- Early Research Experiences:

The three Stonehill students who received summer research fellowships for the summer of 2007 graduated this past May two with degrees in biology and one with a degree in biochemistry. A comment from Lindsay Bonvini, a student who has not excelled in the lecture aspect of science courses but excels in the laboratory, provides anecdotal support for the success of the initiative. During the Summer of 2008, while doing external grant support research with Louis Liotta, she stated that if it wasn't for the sense of accomplishment she gets and how much she enjoys experimental research, she would have switched majors to fine arts. Candinho Gomes, who did not have the required GPA to do research during the Summer of 2007, did raise his GPA over the 2007/2008 academic year and as a result, participated in research with Maria Curtin over the Summer of 2008. He was clearly excited and enthused with the whole experience. Candinho graduated in May with a degree in neuroscience.

None of the prospective class of 2011 students who were selected to receive summer research scholarships decided to come to Stonehill. Not only did none of these students elect to attend Stonehill; but also, the number of ALANA students among the science majors in the class of 2011 was very low (three out of 93). Before knowing the make-up of the class of 2011, we still planned to use the scholarship money to fund the summer research of four, class of 2011 students but these students would be selected after they have completed their first semester at Stonehill. However, because there were not any qualified ALANA students nor any students that fit the profile described in the grant proposal, no Summer of 2008 research scholarships were awarded to Stonehill students. The Summer 2008 funds were saved to allow more students to participate in the summer of 2009.

The more active role the faculty played in recruiting ALANA students to the sciences for the class of 2012 definitely had an effect. Twelve of the 113 class of 2012 science students (11%) are ALANA students. Two of the students we offered summer research scholarships decided to attend Stonehill and planned to participate in research during the Summer of 2009. However one of these students decided to become a math major and therefore was no longer covered by this particular grant. The second student really never had a desire to be a science major and was simply appeasing her parents when she applied to Stonehill as an undeclared science major. She switched out of the sciences almost as soon as she arrived at the College. With the large pool of ALANA students, there was not a problem selecting students who fit the profile described in the original grant proposal to participate in research over the Summer of 2009. Eight students were originally selected for summer research positions but one did not have the required GPA. As a result, seven students were offered research positions for the Summer of 2009 and one fellowship was saved for the Summer of 2010 for the other student if he raised his GPA.

Seven out of the seven summer research students completed evaluation at the end of the program. Five out of the seven students said the experience increased his or her desire to pursue a career in the sciences, six said the research exposed them to things they could not have experienced in lab classes associated with college courses, seven said their knowledge increased a great deal over the summer, and six rated the program extremely valuable. Six of the seven students are still science majors (two chemistry, one biology, one neuroscience, and one biochemistry). One of the students is currently a healthcare administration major with a minor in biochemistry.

The recruiting efforts were also successful for the class of 2013. Twenty-two of the 150 science students in the class of 2013 (15%) are ALANA students. Three of the students we offered summer research scholarships decided to attend Stonehill with plans to participate in research during the Summer of 2010. The 4% improvement in the percentage of science students who are

ALANA students that was seen between the classes of 2012 and 2013 (from 11% to 15%) is most likely the direct result of offering S-STEM scholarships. The 4% increase amounts to six students out of the 150 students in the first year class of science students. This is the exact number of ALANA students who are receiving S-STEM scholarships. Since the original aid packages offered to these students left a substantial unfunded need, the S-STEM scholarships allowed the College to better meet the financial needs of these students. However the College did not perform as well at retaining these ALANA students. By the Fall of 2010, only 62% of these students were still in the sciences at Stonehill College compared to 81% for the non-ALANA students. For the most part these students left the sciences at Stonehill because they were grossly under prepared for the level of work.

In the Spring of 2010, five students were originally selected for summer research positions but one did not have the required GPA. As a result, four students were offered research positions for the Summer of 2010 and one fellowship was saved for the Summer of 2011 for the other selected student if she raised her GPA. Only one of the students originally offered summer research scholarships during the admissions process was included in this group. One of the other students selected computer engineering as a major and the other selected computer science. Neither of these majors is covered by this grant. Four out of the four summer research students completed evaluation at the end of the program. All four students said the experience increased his or her desire to pursue a career in the sciences, all four said the research exposed them to things they could not have experienced in a lab classes associated with a college course, all four indicated their knowledge increased over the summer, and all four considered the program extremely valuable.

The recruiting efforts were not as successful for the class of 2014. Nineteen of the 189 science students in the class of 2014 (10%) are ALANA students. None of the students we offered summer research scholarships decided to attend Stonehill. In addition, none of the students to whom we offered S-STEM Scholarships decided to attend Stonehill. This decrease in the number of ALANA students is most likely the result of the College offering significantly less financial aid. The class of 2013 had a discount rate of over 40%. The targeted discount rate is about 32%. The discount rate that brought in the class of 2013 is unsustainable and as a result the College offered significantly less financial aid to the class of 2014. In general, the ALANA students are those in the most need of financial aid; thus, the decreased financial aid impacts them more significantly than the rest of the student body. Even with the S-STEM scholarships, which are limited to \$10,000 maximum and average \$7500, many ALANA students simply could not afford to attend Stonehill. S-STEM scholarships were awarded to some of the nineteen ALANA students who decided to attend Stonehill. Likewise, the Summer of 2011 research students will be selected from these nineteen students. The higher admission standards of the College compared to the class of 2014 combined with offering less financial aid than in previous years resulted in even worse result for the class of 2015. Only 10 out of the 139 science students in the class are ALANA students. The fact that we could no longer offer the summer research fellowships may have also played a role.

Two of the Massasoit students that did research during the Summer of 2007 transferred to BS science programs. In the Fall of 2007, Mark Godek transferred to Stonehill as a Biology major and Stesha Joseph transferred to Utica College with a plan to major in science to pursue pre-medicine. Mark graduated this past May from Stonehill with a degree in Biology. Stesha's plans changed while she was at Utica College. After graduating in the Spring of 2009 she started in a PhD Chemistry program at Seton Hall University. When recently contacted about her plans, her response to Dr. Liotta included the following statement. "I used you in my application essay. After all, you are the reason that I am pursuing a Ph.D. in Chemistry." In the Fall of 2008, John

Medeiros, a third research student from the Summer of 2007, started the Radiologic technology program at Massasoit after completing his Associates Degree. He was accepted to the accelerated bachelor's program for radiation therapy at Mass College of Pharmacy but chose Massasoit because it was cheaper and not as specialized. The remaining Summer of 2007 research students, Irene Cherney and Moriah Phillips, have not yet graduated from Massasoit. Irene did research again during the Summer of 2008. Both Irene and Moriah took time off from their studies for maternity leave purposes.

Three of the Summer 2008 research students (Patricia Locke, Oanh Nguyen, and Jonathan Mandozza) transferred to the University of Massachusetts Boston to pursue degrees in the sciences in the Fall of 2008. Jacquelynn Benjamino had one semester left at Massasoit before completing her Associates Degree and then transferred to the University of Massachusetts Boston as well. Jacquelynn also worked part-time as a technician for microbiology at Massasoit. Both Patricia and Jacquelynn had originally planned to go into nursing but, partly as a result of their research experience, have decided to pursue four-year science degrees. Jacquelynn is currently completing her last semester of her B.S. degree in biology and is applying to biology Ph.D. programs. Patricia currently has two semester remaining to complete her B.S. in biology and plans to apply to nurse practitioner school.

One student from the Summer of 2009, Steven Steinmetz, is majoring in Physics at Bridgewater State College, one, David Bocchetti, is in the accelerated program for a bachelors in Radiology at the Massachusetts College of Pharmacy and Health Science, one, Kyle Corkery, is majoring in Engineering at Northeastern University, and one, James Chavre, is majoring in Chemistry at Columbia University. Two students, Robert Lurie and Benito Louis, remained at Massasoit for the 2009-2010 Academic Year. Robert Lurie has since transferred to the University of Massachusetts Boston and is majoring in chemistry.

Based on their responses on end of the summer surveys, in general, all the Massasoit students found the research experience to be enjoyable and felt that they were able to apply concepts that they learned in the past in a practical way. They appreciated the close interactions with faculty from both Massasoit and Stonehill. Some of them would have liked a couple days of orientation at the beginning of the summer explaining how to use the equipment and the like.

Steven Steinmetz recently commented when presenting his summer research to the Massasoit community:

“This is a great program and I would recommend it to any student who's thinking of continuing in science, especially if you are thinking of pursuing a graduate degree. I really enjoyed working full time in a research position. It gave me the opportunity to use some of what I've learned in classes and apply it in practice. For me, the experience made what I've been studying more "real" and allowed me to understand what certain principles mean in a practical real-world setting. I'm just started at BSC as a physics major and I'm already making contact with faculty to find out about, and express my interest in the undergrad research opportunities there. The fact that I have this prior experience gives me an advantage over other students competing for those openings. For me, this experience confirmed that I enjoy working in the lab and that going to graduate school is something that I hope to be able to do in the future. The chance to work closely with the Stonehill faculty was great. I was able to talk to people from multiple disciplines to find out what their work is all about, which is useful if you're undecided on what direction you want to go in. One of the most valuable activities that took place this summer was when we had the chance to talk to them about what grad school is like and find out about their personal experiences. Even the Stonehill students

were great. I had the chance to talk to some students about their own research and see what they were going through to complete their thesis.”

The six Massasoit students who did research in 2010 are all continuing in the sciences. One of them, Patrick Hill, has transferred to Stonehill as a biology major. Amanda Withey is at the University of Massachusetts Amherst majoring in Biology. Michael Polino has transferred to Bridgewater State College as a chemistry major with a minor in secondary education. Jennifer Bevis has transferred to the University of Massachusetts Boston as a biochemistry major and plans to pursue a doctorate in the future. Both Sean McManus and Brian Celino are continuing their science education at Massasoit Community College. Sean plans to transfer to a four year school next year while Brian has not decided whether he wants to transfer to a four year school or go to nursing school. Similar to the Summer of 2009, the Massasoit students doing research in the Summer of 2010 universally found the experience to be extremely valuable and to increase their desire to pursue a career in science. They were very grateful that this opportunity was afforded them, almost to the point of disbelief in some cases. They had very positive experiences with both their Stonehill and Massasoit faculty mentors. They found the Stonehill students to be friendly and welcoming; they felt part of the community.

The table below summarizes the plans of the eight Massasoit students who did research during the Summer of 2011. These students were funded by both the NSF-STEP grant and a grant from the Lloyd G. Balfour Foundation.

<i>Student Researcher</i>	<i>Education Plans</i>	<i>Long-Term Goal</i>
<i>Oluwadara Alaba</i>	Transferring to UMass Amherst in fall of 2011	Medical career
<i>Janayna Hedges</i>	Transfer to four-year college to pursue biochemistry degree	Biochemistry research career
<i>G. Florent Taguezem</i>	Transfer to UMass Boston in fall of 2011	Medical career
<i>Zoe Estabrooks</i>	Finish degree at Massasoit then transfer to four-year college for a biology degree	Biological research career
<i>Andreia Vieira</i>	Transfer to Stonehill College for a biochemistry degree	Biochemistry research career
<i>Jessica MyClymont</i>	Finish one more semester at Massasoit then transfer to Bridgewater State for a chemistry degree	Not yet sure
<i>Yevgeniya Wright</i>	Transfer to Regis College in fall of 2011 with plans to enter the B.S. nursing program	Nurse Practitioner
<i>Jordan Hathaway</i>	Finish degree at Massasoit this fall then transfer to UMass Boston or UMass Dartmouth for nursing	NICU nurse

Comments from the student evaluations are provided below. These comments appear to indicate that the research experience is having the desired effect on the students. However, as expected, not every student is drawn into a science career some plan to pursue a career in medicine.

- *As a result of this program, “I am thinking to become a MD in infectious disease now.”*
- *“I did like the confidence my mentor had in me.”*
- *“What I liked best about this program was my chance to experience doing lab work! This is an opportunity that I otherwise would not have to further my knowledge.”*
- *“When I entered the program I wanted a career in microbiology and I still do.”*

- *I like best “doing the research and learning about what happens in a real lab.”*
- *“This program helped me decide to go for a degree in chemistry.”*
- *“I liked the relationships I have built as well as the exposure to new things and knowledge. I always loved working in the lab and this opportunity was a like a dream come true. I had the chance to see how working in a lab really is and being able to work on my own was a learning experience.”*
- *“This experience enhanced my future college plans. I always wished to work any science related projects and this experience gave me the extra “push” I was looking for.”*
- *“This experience served to confirm and to ensure me that my career “belongs” in the sciences. I love every minute of my day at the lab as well as my mentors, faculty collaborators, and other students in my lab group.”*
- *“The experience has made me sure of the feeling I had been having, which is I love working with people and being in a lab all day is not my kind of environment.”*

Kendra Twomey and Rachel Hirst have used their \$15,000 start up money carefully and wisely. Many of their equipment purchases have been in the form of used equipment from auction and used equipment websites. Kendra has more or less completed the purchase of equip and lab supplies. She now has the ability to fully equip a synthetic organic chemistry laboratory to accommodate four students. At this point she has \$2800 remaining to purchase chemicals needed to start the research. Rachel is similarly in the process of equipping a molecular biology laboratory but has not yet finished purchasing all the needed equipment. Giles Bolduc and Vasumathi Desikan both still need to determine what research startup supplies and equipment they need to purchase. As a result of initiatives started under this grant, Massasoit Community College has been greatly enhancing its STEM resources in the past year. The College has received a number of grants to purchase equipment and is renovating space to house some of this equipment. Because of these rapid changes in a short time deciding the best way to spend the research startup money associated with this grant is not immediately clear. Thus a one-year, no-cost extension was requested for this grant to allow a sounded decision to be made.

As the result of her experience during the Summer of 2008, Rachel Hirst has become very excited about the Massasoit-Stonehill partnership. As well as being interested in research and getting her students involved in research, she has also become a guiding force for mentoring Massasoit students towards transferring to four-year science programs. She discovered through her conversation with students how little guidance and advice they are getting about transferring to four-year programs in the sciences. Those that do transfer often do not have all the science and math courses they need to finish in two years as they had originally planned to do. Although these transfer students would probably be best served by select four-year liberal arts colleges like Stonehill, very few of them even consider transferring to such institutions. In addition to lack of advice, the other major obstacle to students transferring to such institution is the perceived cost of these colleges. Rachel planned and executed a series of events during the 2008/2009, 2009/2010 and 2010/2011 academic years to identify and better advise students with the potential to transfer to four-year colleges in the sciences (see section on mentoring below). During the Summer of 2011, Rachel was offered and accepted a tenure track biology position at Stonehill College. While Rachel leaving Massasoit Community College is a great loss for Massasoit, Rachel’s experiences will be very beneficial to Stonehill as it expands its successes with Massasoit Community College to other community colleges. In addition, as a result of Rachel leaving Massasoit, her advising and mentoring duties have been split between Kendra Twomey,

Vasumathi Desikan and Gilles Bolduc making them all more vested in the entire process not just the summer research.

Initiative #3 -- Enhanced Mentoring, Tutoring and Advising:

Only seventeen of the 32 selected students chose to participate in the Fall 2006 mentoring program and those seventeen did not fully participate in all activities. Two social events were planned during the semester as study breaks for mentees and mentors. While mentors showed up at these events, not a single mentee attended either one. The participating mentees did, however, meet with the mentors a few times during the first semester to discuss how things were going so far and to address any concerns the students had. The general feeling among the invited students appeared to be that needing a mentor meant that you were inadequate in some way. Since students do not want to admit that they may have some deficiencies they chose to not participate in the program. Also it appears that students are more likely to attend small events with a few students and their mentor than to attend large events involving all the students and mentors.

Preliminary data appeared to indicate that a combination of the new Neuroscience major and the mentoring program had a positive impact on the retention of science students. The first-year attrition rates can roughly be based on the number of students starting in General Chemistry in the fall compared to the number of students taking Organic Chemistry II the following fall plus the number of Neuroscience students who chose not to take Organic Chemistry II. The attrition rate for the Class of 2010 was 31% while the rates for 2009 and 2008 were 44% and 47%, respectively. This is a 13% improvement over the previous year. While some neuroscience majors chose to take Organic Chemistry II, there were four majors who were not taking the course since it is not required. These four students were somewhat weaker students and in the past probably would not have continued in the sciences. These four students accounted for about a 4% improvement in the retention rate. Comparing the students who were identified by Admissions as most likely to benefit from a mentoring program to the remainder of the class is very informative. The attrition rate for the identified students was 47% while the rate for the rest of the class was 23%. These results clearly indicate that the group identified by Admissions is twice as likely to drop out of the sciences. However, if this identified group is broken into those who participated in the mentoring program and those who did not, the attrition rate of participants was only 29% while that of the non-participants was 67%. This indicates that student participation in the mentoring program accounted for about a 5% improvement in the overall class retention rate. In summary, 9% of the 13% improvement could be accounted for by the Neuroscience major and the mentoring program.

The results from the class of 2011 when mentoring was provided for all students in General Chemistry are even better. The first to second year science retention rate for the class of 2011 was 74%, compared to 69% for the class of 2010 and 56% for the class of 2009. Starting in the Fall of 2007, the College added an Environmental Studies major which similar to Neuroscience does not require Organic Chemistry II. Thus a Class of 2011 student who took General Chemistry in the Fall of 2007 was considered to be retained in the sciences in the Fall of 2008 if they were in Organic Chemistry II or were either Neuroscience or Environmental Studies major who chose not to take Organic Chemistry II. The student evaluations of the Fall of 2007 PLTL leaders and mentors indicated that students were overall very pleased with the programs. It was also evident that two of the 17 leader/mentors provide no extra mentoring over the PLTL sessions. In order to receive an additional mentoring stipend over their pay for being a PLTL leader, the advanced students had to have provided extra mentoring. These two leader/mentors did not receive the additional stipend. In addition, eight other leader/mentors did not receive a stipend because they never completed the paper work reporting on their additional activities even

though the General Chemistry students reported on these activities in their evaluations. The fact that so many mentors did not apply for the additional stipend implies that they did not consider the extra mentoring a chore but just did it as a matter of course.

The results from the classes of 2012 and 2013 are very close to those from the class of 2011. The first to second year retention rates were 78% and 77% respectively. The college added a major in Physics in the Fall of 2008. This major required a semester of General Chemistry and Organic Chemistry I but not Organic Chemistry II. Thus we classified students as being retained in the second year if they were enrolled in Organic Chemistry II, or were majoring in Neuroscience, Environmental Studies, or Physics. The student evaluations of both the Fall of 2008 and Fall of 2009 PLTL leaders and mentors indicated that the students were very pleased with the program. The evaluations indicated that all the leaders/mentors provided extra mentoring beyond the PLTL sessions. In addition, unlike the Fall of 2007, all the mentors completed the proper paper work reporting on their mentoring activities and thus all received the additional stipend.

As was expected based on student performance during the first-year, the first to second year retention rate (68%) of class of 2014 students in the sciences was significantly lower than it had been the previous three years. This higher attrition rate was seen across the College not just in the sciences and most likely was the result of the lower admissions standards for this class. Some of this attrition could have been mitigated if these lower admissions standards had been communicated to the faculty before the start of the academic year. These lower standards have been adjusted back up for the class of 2015, actually with the lowest percentage of students from the bottom two admissions categories matriculating at the college in many years. Thus the high attrition rate will be considered a one-time occurrence at this time.

For the first two years of the grant, we found that the demand for chemistry tutoring at Massasoit has exceeded our ability to recruit qualified Stonehill students to provide the tutoring. In the first year of the grant, funding for 61 hours of tutoring was not spent and in the second year of the grant, funding for 144 hours was not used. In the third year of the grant, there was a senior biochemistry major that made tutoring at Massasoit one of her top priorities. As a result, all 448 hours of tutoring that were planned for in the grant were provided. This past year, the fourth year of the grant, we were back to not using all the tutoring hours for which we had budgeted. During the 2009/2010 academic year, funding for 173 hours of tutoring was not used and during 2010/2011, funding for 82 hours was not used. The obstacle to getting Stonehill students to serve as tutors is that they need a car and they need to drive through Brockton traffic every time they tutor. Ten dollars an hour is not a sufficient premium over the eight to nine dollars an hour they can earn for an on campus job.

Although the articulation agreement was signed in July of 2007 its existence and content was not originally communicated to the Massasoit students; thus, they still did not know what courses they should take if they planned on transfer. The many programs planned and carried out by Rachel Hirst as well as changes made in how Massasoit assigns faculty advisors during the 2008/2009 academic year has done much to rectify this situation. A distribution lists containing the contact information of about 130 students each year have been created. There was a regular attendance of 30-45 students at each of the events held over the 2008/2009, 2009/2010 and 2010/2011 academic years. Science transfer students are now assigned science faculty as their advisors. There has been a marked increase in the enrollment in second semester science courses.

Initiative #4 -- Summer Bridge Program:

In 2007, none of the students identified by Admissions as most needing the program chose to participate. In the Fall of 2007, a survey was given to all General Chemistry student to ascertain why they chose not to participate in the program. Although the survey was given to all students only the surveys completed by the 30 students identified by admissions as most likely to benefit from the program were analyzed. The top three reasons students gave for not applying in order were "I could not give up the income from my summer job," "I did not want to give up three weeks of my summer," and "the program interfered with a family vacation."

Evaluations completed by Bridge Program participants from the last three summers indicate that they overwhelmingly felt the program increased their comfort in living and learning at Stonehill College, provided them an opportunity to develop an early peer group, provided them early one-on-one contact with science faculty, provided them a head start on college writing, math and science, provided them more self-confidence at the start of the fall semester, and felt the program would enhance their achievement in the sciences. Written comments had nothing but praise for the program, strongly recommending it to other students.

When comparing the 2007 Bridge Program participants to a similar group of student who did not participate in the Program, the participants had a higher GPA in General Chemistry, 2.94 compared to 2.47 and a higher median grade in General Chemistry, 3.3 versus 3.0. Two of the students in the comparison group withdrew from General Chemistry before the semester was over while none of the Bridge Program participants withdrew from the course. However, two academically strong Bridge Program participants changed their majors from science to other majors (one to math and one to English) before the start of the semester and so did not take General Chemistry. In addition, all the students in the comparison group who finished General Chemistry went on to take second semester chemistry while four students who were in the Bridge Program did not continue to second semester chemistry after completing General Chemistry. Conversations with some of the Bridge Program participants has provided some insight into why so many of them have dropped out of the sciences. Apparently many of the students who applied for the Bridge Program did so because they were not sure they wanted to major in the sciences from the start. They viewed the program as a way to explore their options. Thus, as a group, they were more likely to follow other interests even though they performed better in their science courses than the comparison group. Some of the changes made in recruiting students to the program to better attract the target group of students should also partly address this self-selection issue.

The changes made in the methods of recruiting of students to the 2008 Bridge Program resulted in more of the target students applying to the Program. For instance while 12% of the first-year science students participated in the Program, 25% of the first-year ALANA science students participated. Participation in the 2008 Bridge Program had a marked impact on the participants' grades in General Chemistry and in the tendency of the students to continue to second-semester chemistry compared to an academically matched control group. The General Chemistry GPA for Bridge Program participants was a 2.25 while the General Chemistry GPA for the comparison group was 2.07. Similarly the second semester chemistry retention rate for the Bridge Program students was 79% versus 57% for the comparison group.

The improvements in recruiting targeted students into the 2008 Bridge Program appear to have been not only retained but also improved upon when recruiting students for the 2009 Bridge Program. With larger applicant pool from which to select students, we did a better job of selecting students who were more in need of academic support. That is the 2009 Summer Bridge Program participants were academically weaker than either the 2007 or 2008 participants. Four of the 18 students (22%) of the Bridge Program participants were ALANA

students while only 15% of the first-year science students were ALANA students. Participation in the 2009 Bridge Program again had a marked impact on the participants' grades in General Chemistry and in the tendency of the students to continue to second-semester chemistry compared to an academically matched control group. The General Chemistry GPA for Bridge Program participants was a 2.68 while the General Chemistry GPA for the comparison group was 2.33. Similarly the second semester chemistry retention rate for the Bridge Program students was 82% versus 73% for the comparison group.

The method of recruiting continues to be successful. As was the case in 2009, we appear to do a better job each year of attracting the target audience to the program. With an even larger applicant pool than in 2009 from which to select students, we selected students who were more in need of academic support. That is the 2010 Summer Bridge Program participants were academically weaker than participants from any previous year. Seven of the 22 students (32%) of the Bridge Program participants were ALANA students while only 10% of the first-year science students were ALANA students. The General Chemistry GPA for Bridge Program participants was a 2.35 while the General Chemistry GPA for the comparison group was 2.01. Similarly the second semester chemistry retention rate for the Bridge Program students was 74% versus 58% for the comparison group. The GPA and retention rate of both groups was lower than in previous years again reflecting the weaker class but the Bridge Program participants still did substantially better than the comparison group students.

Initiative #5 -- Career Exploration:

The annual Career Night Dinners hosted by the Biology Department are held every Fall. Through these dinners, students have had the opportunity to meet and eat in small groups with alumni who are already well established in different science or science related professions. During desert and coffee, the alumni spoke briefly about their path to their profession or career (e.g., research, teaching, medicine, physician assistant, nurse practitioner, medical technology, dentistry, podiatry, optometry, chiropractic, pharmacy, physical therapy, industry) and about the joys and challenges of their field. Student then approached the alumni individually and requested contact information for follow up questions or for shadowing opportunities. Ten to twelve alumni have participated each year and about 80 to 90 students.

The second career event that has been hosted by the Biology Department is called "Life After Stonehill." This event has been held every spring semester and involves alumni who are currently in graduate or professional schools. After having dinner with the faculty, the alumni sat at tables to discuss their particular programs with students. Students were encouraged to move to several tables to hear about the many opportunities available. This event has drawn about 60 to 80 students each year, primarily first-year students.

The Chemistry and Biochemistry Clubs Career Night Dinners were held in March of 2009 and February of 2010 and 2011. The club members invited six speakers in 2009 and four speakers in both 2010 and 2011 who had majored in chemistry or biochemistry and were now in various careers. After dinner, each of the guests gave a five to ten minute talk about what is needed to pursue a career in their particular field and on what makes their particular career rewarding.

The guests in 2009 were:

Nicholas J. Greco: Chemistry Postdoctoral Fellow, Boston College

Gene Cassis: Vice President of Marketing and Finance, Waters Corporation

Debbie Barrett: Registered Nurse, Rhode Island Hospital

Joseph P. St. Laurent:, Owner of a Analytical Testing Company, Chemic Labs Inc.

Dr. Bob Moreau: Dentist
Dr. David Mudd, M.D.: Medical Doctor

The guests in 2010 were:

Coreen Beaumier: Scientist at the Walter Reed Army Institute of Research
Barbara O'Brien: Director, Office of Alcohol Testing, Mass State Police
Bryanna Glod: Research Assistant, Genzyme
Shannon Ingraham: Chemical Engineer, Pfizer

The guest in 2011 were:

Gauri Dhavan, Ph.D, J.D., Litigation Department, Goodwin Procter
Eric Dombrowski, Ph.D program at Tufts
Laura Ingalls Ph.D; Senior Scientist at the Warner Babcock Institute for Green Chemistry
Chris Noren Ph.D; Head of Bioorganic Chemistry New England Biolabs

Initiative #6 -- AP Chemistry and Biology Lab Enhancement:

During the 2007/2008 academic year, 41 total students participated in the Advanced Placement Laboratory program, 19 in biology and 22 in chemistry. Of these students, 12 were from Brockton High School, a school at which 60% of the students receive free or reduced lunch. An additional 16 students were from Randolph High School, a school at which 46% of students receive free or reduced lunch. Of the 41 students participating, 51% were ALANA students. AP test score data from Brockton and Randolph High Schools are encouraging. The average AP biology test score was a 2.75 (N=8) for those students who participated in the laboratory experience and 1.92 (N=12) for those who did not participate. While in chemistry the average score was 1.96 (N=24) for those who participated in the laboratory and 1.21 (N=24) for the student who did not.

During the 2008/2009 academic year, 67 total students started out participating in the Advanced Placement Laboratory program, 41 in biology and 26 in chemistry. Of these students, 29 were from Brockton High School and 38 were from Randolph High School. Attendance, particularly for the students from Brockton High School was a much larger problem in the 2008/2009 program than it was for the 2007/2008 program. As a result a number of students had to be dismissed from the program (8 Brockton Chemistry students, 7 Brockton Biology students, and 4 Randolph Biology students), thus a total of 48 students completed the program. Demographic information was collected on 46 of the 48 students who completed the program. Eighty-five percent of the students were ALANA students (52% Asian, 29% African, and 4% Latino). The average AP biology test score was a 2.17 (N=29) for those students who participated in the laboratory experience and 1.12 (N=16) for those who did not participate. While in chemistry the average score was 2.71 (N=17) for those who participated in the laboratory and 1.56 (N=9) for the student who did not. It is interesting that the most common, open-ended comment on how to improve the program given on the student evaluations of the program was to have more laboratory sessions and/or longer sessions. Obviously the students both enjoyed and found beneficial the opportunity to do hands-on experimentation even if it meant giving up part of a Saturday.

During the 2009/2010 academic year, AP Chemistry and Biology Laboratories were offered to both Randolph and Brockton high school students in a manner similar to the 2008/2009 academic year. At the start of the program a total of 59 students started out participating in the program, 27 in chemistry and 32 in biology. Of these students 11 were from Brockton and 47 from Randolph. Demographic information was collected on 52 of the 57 students who completed the program.

Eighty-five percent of the students were ALANA students (47% Asian, 19% African, 13% other which usually means mixed race, 2% Native Hawaiian/Pacific Island and 4% Latino). The average AP biology test score was a 2.43 (N=28) for those students who participated in the laboratory experience and 2.00 (N=8) for those who did not participate. While in chemistry the average score was 1.89 (N=27) for those who participated in the laboratory and 1.00 (N=2) for the student who did not.

During the 2010/2011 academic year, AP Chemistry and Biology Laboratories were offered only to Randolph high school students in a manner similar to the 2009/2010 academic year. At the start of the program a total of 53 students started out participating in the program, 30 in chemistry and 23 in biology. We are still waiting for Randolph High School to send us AP exam scores from the Spring of 2011.

Sustainability:

Theme-based General Chemistry: The theme-based General Chemistry is now a permanent part of the chemistry curriculum. All General Chemistry I sections are taught in this fashion. The funds to cover of the extra faculty time will be paid by the College.

Early Research Experiences: The College received a grant from the Lloyd G. Balfour foundation to fund additional early research experiences during the Summer of 2011. We will be reapplying to this foundation again to hopefully continue this funding. Many strides have been made at Massasoit Community College to establish research as part of the science curriculum and to carry out research at Massasoit during the summer. For a combination of these research opportunities and for continued effort in bridging the way for students to transfer to four-year institution Massasoit has been recognized and has received funding from a number of sources. They were recognized with an @Scale Endorsement and will eventually receive funding for their transfer initiative by Governor's STEM Advisory Council. Massasoit received a \$100,000 grant from the Massachusetts Life Sciences Center to purchase equipment towards establishing a biotechnology degree. Massasoit was a co-institution on a TAACCCT grant awarded by the US Department of Labor to the Massachusetts Community Colleges. Massasoit will use the funds to purchase research and teaching instruments and equipment. Faculty at Massasoit plan to submit an ATE grant to the NSF to actually fund this planned summer research.

Enhanced Mentoring, Tutoring and Advising: Mentoring of first-year Stonehill Students will become a normal expectation of all General Chemistry PLTL leaders. These PLTL leaders will be hired through the Colleges Academic Achievement Center. The improved advising at Massasoit has become part of the standard operating procedure. Science students are now assigned science faculty advisors instead of randomly assigning them to faculty members for advising. Chemistry tutoring by Stonehill students at Massasoit is still looking for funding for this program to continue.

Summer Bridge Program: Activities of the Summer Bridge Program will be assumed by the College's new ACE program. The ACE program is a College wide summer bridge program designed after the Science Summer Bridge Program.

Career Exploration: The career night programs will be continued by the Biology Department and the Biochemistry and Chemistry clubs. The Department of Chemistry and Biology Department will also sponsor regular seminar speakers which will also provide insight into different careers in which the students might be interested.

AP Chemistry and Biology Lab Enhancement: At this point this program will be terminated since no funding has been found to continue the program.

Evaluation:

The report prepared for us by our external evaluator, Ronnie Halperin is attached following in the next page.

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**PROGRAM EVALUATION
FOURTH YEAR REPORT
SEPTEMBER 2010**

***A PUBLIC-PRIVATE PARTNERSHIP TO INCREASE ENROLLMENT, RETENTION, AND DIVERSITY
IN CHEMISTRY, BIOLOGY, AND BIOCHEMISTRY
NSF/STEP
STONEHILL COLLEGE AND MASSASOIT COMMUNITY COLLEGE***

Stonehill College, in partnership with Massasoit Community College, launched a STEP Type I program, in the fall of 2006. The overall goal of the program is to increase the number of students obtaining bachelor's degrees in STEM fields. The program will complete its fourth year of operation on September 30, 2010. This report 1) describes the program implementation with an emphasis on the past year, 2) evaluates the extent to which each of the six program components has contributed to the program objectives, 3) assesses the sustainability of the program once funding ends, and 4) makes recommendations about program implementation and overall management.

Program Objectives

1. Attract 37 more students per year, by year five, to Stonehill's Chemistry, Biochemistry and Biology majors.
2. Reduce average Stonehill attrition rates in the sciences from 47 percent to 23 percent.
3. Increase science transfer track enrollments at Massasoit by 35 students.
4. Increase the number of traditionally underrepresented students in STEM degree programs at Stonehill by 24.

Evaluation Methodology

The evaluator first became acquainted with Stonehill's STEP program in the spring of 2009 when the program was already into its third year. In August 2009 and again in August 2010 the evaluator visited the program, conducting interviews and focus group meetings with students and faculty involved in the six program components and the program director. In addition, data sent to the evaluator electronically were analyzed.

Program Evaluation

1. *Revising General Chemistry as a Theme-based Course*

Course Description and Implementation

The theme-based chemistry course is a central component of Stonehill's STEP program. It was designed to 1) stem the tide of students who exit science majors after taking the traditional General Chemistry course, 2) attract new science majors, and 3) more fully engage and excite existing science majors.

Stonehill College began offering a theme-based version of General Chemistry in the fall of 2007 while continuing to offer the traditional version of the course. As of the start of the fall of 2009 semester Stonehill offers only the theme-based version of the course. Courses using previously developed themes (in nutrition and forensics) were continued and three new theme-based courses, one in Chemistry in Medicine, one in Chemistry in Art and another in Environmental Chemistry, were introduced. Also, in the fall 2009, due to planned changes concurrent with the opening of a new science building, Stonehill admitted 155 freshmen intending to major in science, all of whom as well as 30 returning students (for a total of 185) had to be accommodated in the first semester of General Chemistry (compared with 123 total students in both 2007 and 2008). Since the theme-based version of the course is designed for a smaller class size, the increased enrollment along with the commitment to change over completely was a challenge. In order to meet the objective of offering the theme-based version of the course to all incoming science majors, two sections of General Chemistry that were intended to be 16-student writing intensive sections were increased to 24 students, the faculty member teaching the forensics themed section taught a second section as an overload, and a part-time faculty member who had previously taught at the college was hired to teach a nutrition themed section of General Chemistry.

The theme-based version of General Chemistry uses the same textbook and covers the same material as did the traditional version of the course. The course's theme is manifested mainly through the examples and problems the students must solve, and through lab experiments. Faculty continue to describe their efforts in this course re-design as "a work in progress," and continue to feel that the theme serves to better engage students.

In previous years, the theme-based course was offered in two 3-hour blocks each week, as opposed to the traditional course, which was offered in three fifty-minute lectures and one three-hour laboratory meeting per week. This change was intended to increase fluidity between the lecture and lab components of the course. This year, however, many of the professors chose to offer the course in three 2-hour blocks because three hours was a challenge to the attention span of many of the students. Some faculty pointed out that they also preferred seeing their students three times, rather than twice weekly. All faculty are in agreement that both formats are an improvement over the old one employed in the traditional course format, in which the lab was discontinuous with any lecture time, and required a pre-lab component to re-contextualize the lab activities. One faculty member expressed the intention of developing more activities in which lab and lecture could be further integrated.

The evaluator met with two groups of students: One group had taken the theme-based course and the other had taken the traditional course. Students who took the theme-based chemistry course for the most part reported that the increased fluidity between lecture and lab components was an asset. However, some reported that professors didn't adhere to the planned split in lecture and lab times, and many said that the two 3-hour blocks were too long to hold their attention. Students unanimously agreed that the smaller class size and the untraditional format led to their having closer relationships both with other students in the class and with the faculty. Several students provided examples of the intensive mentoring they received and the impact it had in directing them towards career goals in science.

Interestingly, the students who had taken the traditional chemistry course reported that they thought they had the better experience. They felt that for serious science majors the traditional course, with boundaries separating the lab and the lecture—separate notebooks and prescribed times for lab and lecture—led to better organization. They felt that the traditional course better prepared students for organic chemistry, although they thought that the theme-based labs seemed “cool” and were probably more fun. When asked about faculty mentoring, they too reported having close relationships with what they described as a very nurturing science faculty. Students from both groups talked about a wide range of careers in science that they were considering—Ph.D., in chemistry, pharmacy, pharmaceutical science, dental school, high school chemistry teacher, forensic science—all of which they appeared to have discussed with their chemistry professors.

Theme-based sections of General Chemistry, focusing on nutrition, continue to be offered at Massasoit Community College, although changing the time format there is not an option. The professor who offers that course felt that it provided an opportunity for a more “whole student” approach, and that the students were more engaged and more interested in the subject matter. She is considering offering a section of Environmental Chemistry next year.

Student Performance in the Course

In last year's report, student performance in theme-based and traditional sections was compared for all enrolled freshmen in the fall 2007 and 2008 according to three measures: performance on common exam questions, proportion of mid-semester deficiencies, and final course grades. In addition, retention of science majors from the beginning to the end of the course, and student progress in science, as measured by registration in Organic Chemistry, were compared for the two versions of the course. Students in the theme-based course performed better on common exam questions, had fewer mid-semester deficiencies, remained science majors and registered for Organic Chemistry at higher rates than those in the traditional course. In addition, based on scores for common exam questions, the students in the class of 2011 (fall 2007 enrollees) performed better overall than did the students in the class of 2012 (fall 2008 enrollees) whether they were in the theme-based or traditional courses.

This year, with only the theme-based version of the course offered, we have evaluated retention in the science major as of the summer of 2010 for the classes of 2011 (entered in 2007), 2012 (entered in 2008), and 2013 (entered in 2009). We have looked at retention among entering freshmen science majors. Students who transferred out of Stonehill their

first year were considered two different ways, either as not being retained or excluded from the data altogether. (The reader is reminded that for the class of 2013 there is no comparable data for the traditional course.) One notable finding is that a higher percentage of students in the class of 2011 remain science majors than in the class of 2012. This is the opposite of what would be expected if the two classes were equivalent. That more students from 2011 remain science majors at a fixed time is consistent with their better performance overall (based on common exam question scores) than the class of 2012. Nonetheless, for both classes, regardless of whether one includes or excludes students who transferred, retention in the sciences is higher among those who took the theme-based course. Most important, the gains in retention rate initially seen for those in the theme-based course appear to remain one and two years later.

Table 1. Rate of retention in the science major in summer 2010 for students exposed to traditional or theme-based chemistry in 2007, 2008, and 2009.

Graduation Date	Entry Status	Traditional	Theme-based
Class of 2011	Freshmen (including transfer)	60.0	69.2
	Freshmen (excluding transfer)	63.5	73.0
Class of 2012	Freshmen (including transfer)	50.0	65.3
	Freshmen (excluding transfer)	56.1	69.6
Class of 2013	Freshmen (including transfer)	N/A	77.7
	Freshmen (excluding transfer)	N/A	77.7

Student Evaluation of the Course

Students completed 15-item course evaluations. A repeated measures t-test comparing mean ratings across all 15 items for traditional vs. theme-based versions of the course was conducted. The means and statistical findings, as seen in Table 2, show significantly higher ratings for the theme-based course in 2008; the difference was in the same direction for 2007, and approached significance. Interestingly, ratings for the theme-based course exhibited a small but significant decline over the course of three years, from 2007 to 2009. Given that this course is still a work in progress (new themes and new time formats are still being explored), the small size of the decline is not viewed by the evaluator to be of concern.

Table 2. Mean ratings across 15 items

	2007	2008	2009	Comparison over time
Traditional	4.12	3.73	N/A	
Theme-based	4.26	4.02	3.96	F(2,28)=23.203, p<.001
Comparison of type of course	t(14)=1.943 p=.072	t(14)=4.857 p<.001		

2. Offering an Early Research Experience

The Early Research Experience is a 10-week, 40 hours/week program that runs from the last week of May to early August each summer. Offered in conjunction with Stonehill's SURE program, which is a competitive intensive research experience for upperclassman at Stonehill, the Early Research program serves Stonehill students who have completed only

one year of college and Massasoit students who have completed one or two years. Unlike the SURE program, the Early Research program seeks not necessarily the top students, but those who are highly motivated and hard-working, and potentially handicapped by a lack of self-confidence and/or strong background in science. There is also a strong effort to recruit minority students. All STEP students are provided with a \$3,500 stipend for their participation in the program. The Stonehill students resided on campus during the program, and the Massasoit students commuted to campus.

In addition to working side-by-side with the SURE students in the laboratories, the Early Research students participate in all the extra-laboratory activities offered through SURE. This includes a weekly lunch, often combined with a workshop/advising session, evening activities, barbecues, and two trips over the course of the summer.

For the summer of 2010, 10 students and eight faculty members participated in six labs. Two labs were led collaboratively by a Massasoit faculty member and a member of the Stonehill faculty, each with two Massasoit student participants; three were headed by individual members of the Stonehill faculty, one with two Stonehill student participants and two with one Stonehill student participant; and one was headed by a member of the Massasoit faculty, with two Massasoit student participants. Five of the six labs (those with Stonehill faculty) also had SURE student participants. Table 3 presents the number of student and faculty participants in the Early Research Experience over the four years of the grant.

Table 3. Number of student and faculty participants in Early Summer Research Experience each year

Summer	Students		Faculty	
	Stonehill	Massasoit	Stonehill	Massasoit
2007	3	5	4	2
2008	1	4	3	2
2009	7	6	7	3
2010	4	6	5	3
Total	15	21	18	10
Total unique	15	20	10	5

The evaluator conducted separate focus group meetings with the faculty and student participants in the summer 2010 Research Experience and analyzed 10 mid-summer and 7 end-of-summer surveys completed by students.

What emerged from a focus group meeting between the evaluator and the Early Research faculty was a strong sense that the program was doing an excellent job of serving the students. They also felt that the program enabled them to move their own research forward. When asked about the length of the summer program, the faculty said that it took about five weeks for the students to hit their stride, but that during the second half, an amazing amount of work was accomplished. They felt strongly that providing this intensive research experience for highly motivated, but not necessarily high achieving students was, in many cases, life-changing. The students benefited from an expanded knowledge base, a close

mentoring relationship with faculty, and the experience of intensive immersion in a scientific pursuit. Many became more self-confident about their own potential for careers in science.

In general, the faculty felt that the association with the SURE program was an asset. They felt that in some cases the SURE students served as models for the STEP students. (One Massasoit faculty member felt that the community college students were somewhat intimidated by the SURE students, but this was not corroborated by student responses to a survey question probing that point, as discussed below.) Other faculty thought that some of the students might go on to become SURE students at a later point.

Last year, some faculty complained that there was a delay in getting started on the summer research, specifically in getting all their supplies on time. This was due to the move into the new building. This year the faculty were thrilled to be working in the new science building and the start-up was smooth and on time.

In their focus group meeting with the evaluator, students raved about the research experience. They appeared to the evaluator to be more set on their career goals at this early stage in their education than was last year's group. Their comments about the program focused almost exclusively on their excitement about the research they were conducting. In response to my question about it, the Massasoit students reported that they felt very much welcomed and a part of the Stonehill community. Unlike last year, none complained about the difficulty of integrating the research program with their outside commitments.

Following are some comments in response to my question, "What have you taken away or learned from your experience in the Summer Research Program?"

- "This experience affirmed that this is what I want to do."
- "This solidified my original desire to be a classroom science teacher."
- "I'm only a sophomore but I have research for my thesis. This made me realize I want a Ph.D and my own lab."
- "I learned patience. Things don't go right the first time, and you have to learn to deal."

On the mid-summer and end-of-summer questionnaires, students were asked about the strengths and weaknesses of the program. There were virtually no complaints or weaknesses described, and the strengths included learning lab techniques, getting a taste of what research is like in the real world, getting to know professors, and learning to keep a notebook and work systematically. In response to a pointed question on the subject, the Massasoit students responded uniformly, that they felt included in the Stonehill community of students and faculty. In response to an objective question, all the students reported that their interest in science and their interest in pursuing a career in science increased as a result of the summer research experience. The tables below show student evaluations of the various non-laboratory components of the summer program. They demonstrate that virtually all students are engaged in the wide range of experiences offered outside the lab, and that overwhelmingly, they found them to be enriching and enjoyable.

Table 4. Number of responses on midsummer evaluations (n=10) of activities outside the laboratory

Activity	Attended?		Enrichment Level			Enjoyment Level		
	Yes	No	Low	Medium	High	Low	Medium	High
Weekly lunchtime workshops	10	0	0	4	6	0	4	6
Research presentation	10	0	1	1	8	0	6	4
Social activities outside lab hours	6	4	0	3	3	1	1	4
Relationship with your lab mentor(s)	NA	NA	0	1	9	0	2	8
Relation with students in your lab group	NA	NA	1	1	8	1	2	7

Table 5. Number of responses on end of summer evaluations (n=7) of activities outside the laboratory

Activity	Attended		Enrichment Level			Enjoyment Level		
	Yes	No	Low	Medium	High	Low	Medium	High
Weekly lunchtime workshops	7	0	0	2	5	2	2	3
Social activities outside lab hours	6	1	1	3	2	0	0	6
Relationship with your lab mentor(s)	NA	NA	0	2	5	1	1	4
Relation with students in your lab group	NA	NA	0	2	5	0	1	5

Having the Massasoit faculty participate in the Early Research Experience has provided an opportunity for some members of their science faculty to carry on their own research—something that is usually difficult if not impossible to do at a community college. As described in last year’s report, this has raised the bar for new science faculty at Massasoit, where they continue to require a Ph.D. for all their new science hires, and they advertise the position as affording research opportunities. The Massasoit dean/chair of liberal arts attributes the change to the participation of her faculty in the Stonehill research program.

3. Enhancing Mentoring, Tutoring and Advising

Enhanced mentoring takes place in the context of most of the other STEP program initiatives. This section describes two independent efforts, one at Stonehill and the other at Massasoit, aimed at systemic changes in academic advising and career mentoring, as well as building a community among students and faculty for science majors early in their college careers.

The STEP program channels its mentoring initiative at Stonehill through teaching assistants who staff the PLTL program in *General Chemistry*. These teaching assistants, 23 in all this past year, are paid by the College. The STEP program pays them an extra \$200 for the semester to spend additional time reaching out to and mentoring their PLTL students. The additional mentoring activities include an introductory email, an exchange of contact information, lunch dates, and developing online friendships. Thus the mentoring program capitalizes on the College's already-existing PLTL program.

Stonehill College routinely asks students to evaluate their teaching assistants on a five-point scale (-2 to +2). The STEP program has added an additional set of questions focused on mentoring. This year, 131 students completed evaluation forms (compared to 99 last year). Overall, the ratings were high for both the TA-related activities and extremely high for mentoring-related activities. Tables 6 and 7 show the mean ratings in 2007, 2008, and 2009. A repeated measures ANOVA revealed a significant increase in ratings of TA items [$F(2,26)=12.009$, $p<.001$] and mentoring items [$F(2,10)=22.011$, $p<.001$]. The change for the TA ratings are attributable to an increase in the past year, and the change in the mentoring ratings was due to an increase last year. The students' responses to open-ended questions reveal that they found the TAs/mentors to be supportive, available on short notice, and willing to hold review sessions before exams.

Table 6. Mean ratings on TA questions for 2007, 2008 and 2009

Item	2007	2008	2009
I usually go to this TA after trying the material on my own first	0.75	0.53	0.82
I usually go to this TA to reinforce class material and/or concepts	1.31	1.09	1.21
I usually go to this TA in preparation for an exam/test	1.21	0.90	1.12
My TA was friendly and encouraging	1.62	1.56	1.74
My TA was prompt and dependable	1.33	1.61	1.65
My TA was concerned about my ability to do well in the course	1.20	1.17	1.37
My TA understood my difficulties with the material.	1.25	1.14	1.32
My TA was knowledgeable about the subject.	1.33	1.53	1.55
My TA reviewed my test/paper scores with me.	-0.02	0.05	0.40
I was made aware of study strategies I could use to improve my learning.	0.71	0.63	0.95
As a result of working with this TA, I feel that I understand the content better.	1.25	1.19	1.35
My TA explained the material to me in a meaningful way.	1.12	1.23	1.41
My grades improved with the help of my TA.	0.96	0.82	0.90
I would recommend my TA to other students.	1.27	1.35	1.50
<i>Mean rating across all questions</i>	<i>1.09</i>	<i>1.06</i>	<i>1.23</i>

Table 7. Mean ratings on mentoring questions for 2007, 2008 and 2009

Item	2007	2008	2009
My mentor was friendly and easy to talk to.	1.60	1.64	1.66
My mentor was supportive and listened to my concerns.	1.38	1.49	1.57
My mentor was accessible outside the weekly PSGs.	1.16	1.32	1.28
My mentor gave me good advice about how to be successful in the sciences.	1.10	1.14	1.19
My mentor had a positive attitude about the science program at Stonehill.	1.41	1.56	1.56
I would recommend this mentor to other science students.	1.39	1.55	1.52
<i>Overall mean across all questions</i>	<i>1.34</i>	<i>1.45</i>	<i>1.46</i>

Prior to their participation in the STEP program, faculty at Massasoit had few opportunities to provide academic advising and career mentoring for science students. In part because the students are commuters, but also because of the absence of a systematic effort, there have been few opportunities to meet with students, with the exception of registration day, where they are assisted in selecting classes. Nor were there any forums for introducing students to career opportunities in science. At their last re-accreditation evaluation, Massasoit was cited for poor advising.

There is currently a dean of advising and an organized advising team of five faculty members, who utilize technology to reach students (there's an advising website and a *Facebook* page), hold group and individual advising sessions, support the development of articulation agreements with 4-year colleges, and hold a Science Transfer Day event and a Careers in Science event.

One Massasoit faculty member has undertaken a systematic effort to change the culture for liberal arts transfer-bound students. She has identified the many challenges, designed and mounted activities that can succeed in the face these challenges, and tracked her progress. Her efforts in publicizing a series of events by creating and distributing attractive handouts for faculty and students, asking faculty (via email) to make announcements in their classes, and collecting personal (as opposed to school-based) email addresses of science students, over the course of the 2008-09, and 2009-10 academic years led to her reaching increasing numbers of students.. She also created a database of the attendees and to the extent possible, of all Liberal Arts Transfer in Science (LATS) students. She recently received a grant from the Balfour Foundation to support advising events and pay mini-stipends to faculty involved in specific advising initiatives, and this funding will provide her release time from teaching to further promote advising events.

During the 2009-10 academic year 15 advising events were mounted. Most of the speakers were from four-year colleges, and all the activities were aimed at providing students with the knowledge, skills, and confidence they need to successfully transfer to a four-year institution. Student and faculty attendees were asked to complete evaluations of all events. In general, the evaluations were strong, but more important is that the practice of using feedback to "close the loop" in meeting students' needs is impressive. Tables 8 and 9 attached to this report describe her work in detail.

4. Launching a Science Summer Bridge Program

The Summer Bridge is a three-week program for incoming freshmen who have selected a science major. Students live on campus in rooms on a common hallway and attend three classes each weekday from 9:00 AM to 4:00 PM (including a 1.5 hour lunch break). The courses are in writing and literature, science, and mathematics. The program employs teaching assistants who organize activities and trips during evening hours and on weekends. When the program ends and the fall semester begins, the students remain in the same housing. The 2010 Bridge Program was just starting as this report was being compiled and so will not be evaluated until next year.

Last year, the previous year's Bridge students came on the first day to help the new students move in. According to the professor who ran the program, they were a "tight" group and remained close over the course of the school year. The students in the summer of 2009 went on trips to two science industry corporations (Organogenesis and Genzyme), had presentations by Career Services about internships, summer jobs, and resume writing, were introduced to the pre-med advisor, and had a library workshop.

Twelve students participated in the Summer Bridge program in 2007, 14 participated in 2008 and 18 participated in 2009. In a focus group meeting with several participants in the last two years of the program, the students described the program in extremely positive terms. They found the professors in their courses to be of high quality, they very much valued the idea of meeting them and getting comfortable with them before the start of the school year, and they were glad that they had an opportunity to start out by doing work that didn't count towards their grades. One student said about his Chemistry course once the semester started, "I was well prepared while everyone else freaked." Another said, "I had never done a chemistry lab before coming here." The students felt that the courses were perfectly pitched to their academic needs. The only negative comment was that they were placed in the least desirable housing facility on campus as a result of their participation in the Bridge program.

To determine whether the summer program was associated with better performance in *General Chemistry* the students' grades were measured against a comparison group of incoming science majors. Based on a comparison of 80 students (43 Bridges and 37 comparison group) over the three years of the program, grades were compared in two ways. The mean final grade for the Summer Bridge students was 2.62, and for the comparison group it was 2.31. The difference was not statistically significant [$t(78)=1.234$, $p > .10$]. We then looked at whether there was a relationship between student success in the course (defined by having achieved a grade of C or better), and whether the student was in the Bridge program. Of the summer Bridge students 20.9 percent were not successful, while 27.0 percent of those in the comparison group were not successful. The chi square analysis was not significant ($\chi(1)=0.408$, $p>.10$). Finally, we conducted a chi square analysis to determine whether there was a relationship between participation in the Summer Bridge program and whether a student went on to register for Organic Chemistry after completing General Chemistry. Of the Summer Bridge students, 76.2 percent went on to register for Organic Chemistry, compared to 78.4 percent of the comparison group. The finding was not statistically significant ($\chi(1)=0.054$, $p>.10$), and therefore we conclude that there is no relationship between participation in the Summer Bridge program and registration in Organic Chemistry. Table 10 presents the mean grades in General Chemistry for students in the Bridges and comparison group for each of the three years of the program.

Table 10. Mean grade in General Chemistry for students in Bridge and comparison groups for each year of the program

Year	Summer Bridg	Comparison
2007	2.94	2.47
2008	2.25	2.07
2009	2.69	2.33
Grand Mean	2.62	2.31

5. Providing Opportunities for Early Career Exploration

Early career exploration has been incorporated into other program components, as described above. At Stonehill's Summer Bridge Program the Career Services staff makes a presentation on internships, summer jobs, and careers in science, and the students take trips to local scientific corporations. Students in the Early Research Experience have a number of opportunities, in part through individual mentoring by professors in whose labs they work, as well as exposure to the activities provided by the SURE program.

Massasoit has developed an elaborate career exploration program. Students (most of whom originally think only about nursing) are provided with pamphlets on career options that are possible with a four-year degree in the sciences. Invited speakers, all involved in science careers, make presentations to the students. In the 2009-10 academic year there were ten such events, including a Chemistry Postdoctoral Fellow, a dentist, a chemical engineer, a scientist at Walter Reed Army Institute of Research.

6. Enhancing AP Chemistry and Biology with a Laboratory Experience

Participants in this program component are high school students enrolled in AP Biology or Chemistry courses from area high schools. Using a chartered bus, the program transports the students to Stonehill, where they attend 2.5 hour laboratory classes on each of 10 Saturdays in either biology or chemistry. The course instructors are high school teachers who are alumni of Stonehill and hold Master's level degrees in their subject.

In 2007 three high schools participated: Coyle Cassidy, a private Catholic high school, Brockton High School, and Randolph High School. Coyle Cassidy was not cooperative in providing student scores, and their high school teacher, who they required attend the labs, was disengaged to the extent that he was a poor role model. Therefore, in 2008 only Brockton and Randolph were invited to participate. In that year there were problems with attendance among the Brockton students. Some of the teachers, in their evaluations, suggested that Brockton be eliminated from the program in 2009. In 2009 teachers from both Brockton and Randolph were invited to a planning meeting. While Randolph faculty appeared enthusiastic, the science teachers from Brockton did not attend, although one vice principal did. As a result, the offer to participate in the AP Laboratory Experience was offered to Randolph first and when there were empty slots they were offered to Brockton. The Brockton chemistry teacher decided not to participate, but 10 biology students did participate in the program.

The Stonehill faculty member who runs this component of the STEP program said that this was the program's most successful year. The faculty survey corroborated that perspective. Everyone agreed that the students were more engaged than in previous years, and the engagement and enthusiasm of the high school teacher from Randolph had a strong positive impact as well. One teacher held a review session to go over problems like those that would appear on the AP exam. He reported that he received strong positive feedback from the

students, who he felt really benefited from the session, and he recommends holding two such sessions next year. The other teacher pointed out that most of the labs were new to the Randolph students and repeats for the Brockton students. This may explain the difference in enthusiasm that has been noted between the two groups.

In the 2009-10 academic year 56 students participated in the program. The demographic data on 52 of the students appears in Table 11 below:

Table 11. Demographics of participants in AP lab program

	Male	Female	African Amer.	Amer. Indian/Ala	Asian Amer.	Latino	Native Hawaiian	Caucasian	Other	Total Diversity
#	20	32	10	0	24	2	1	8	7	44
%	38.5	61.5	19.2	0	46.2	3.8	1.9	15.4	13.5	84.6

We received all 56 AP test scores on the program participants for 2009-10, however comparison scores were obtained for only nine students. To conduct a meaningful statistical analysis, students' scores were analyzed for the three years of the program. In all, 134 program participants were compared to 76 non-participating students from the same high schools. Scores were examined in two ways. First, they were divided into two categories: those that achieved a grade of three or higher and those that did not. A chi square analysis revealed a significant relationship between program participation and AP score category [$\chi(1)=11.452, p<.005$]. As can be seen in Table 12, 38.1 percent of the program participants, as compared to 15.8 percent of the comparison group, scored a three or better.

Table 12. Relationship of program participation to scoring a three or higher on the AP exam

Group	AP score of 1 or 2		AP score of 3, 4, or 5		Total	
	#	%	#	%	#	%
Program Participant	83	61.9	51	38.1	134	100.0
Comparison Group	64	84.2	12	15.8	76	100.0
Total	147	70.0	63	30.0	210	100.0

Second, we divided the scores into those that achieved a grade of four or higher and those that did not. This might be considered a more meaningful categorization because scores of 4 and 5 usually enable students to earn college credit. Table 13 presents the same data with that grouping. As can be seen, 20.1 percent of program participants scored a 4 or 5, compared to only 4.0 percent in the comparison group. A chi square analysis revealed a significant relationship between program participation and AP score category [$\chi(1)=10.496, p<.005$].

Table 13. Relationship of program participation to scoring a four or higher on the AP exam

Group	AP score of 1, 2, or 3		AP score of 4 or 5		Total	
	#	%	#	%	#	%
Program Participant	107	79.9	27	20.1	134	100.0
Comparison Group	73	96.0	3	4.0	76	100.0
Total	180	85.7	30	14.3	210	100

Program Sustainability

The Public-Private Partnership to Increase Enrollment, Retention, and Diversity in Chemistry, Biology and Biochemistry, a collaborative project between Stonehill College and Massasoit Community College, has just begun its fifth and final year of funding. Realizing that this funded program has had a profound impact on science education in both institutions, administrators and faculty have been proactive in finding ways to sustain the program once the funding ends.

At Stonehill, this program has taken place in the context of a broader institutional investment in science education. In the fall of 2009 a new science building opened, and the college admitted 155 freshmen intending to major in science, compared to 104 the previous year. An additional line for a chemistry faculty member, initially funded by the STEP program is now half-funded by the College, and when the program funding ends the College will fund the entire line. In addition, the College has expressed interest in taking over the Summer Bridge program. The College is exploring possible funding sources for the AP laboratory experience.

In May 2009, Stonehill, in partnership with Massasoit received a five-year grant of \$600,000 from the National Science Foundation's Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) Program for a project entitled, "*Access to the Science Education of a Four-Year Liberal Arts College for Economically Disadvantaged Students.*" Programmatic features funded by S-STEM that will contribute to sustaining the current program include enhanced advising, mentoring/tutoring, undergraduate research, early recruitment efforts, career awareness, and access to financial aid.

In April 2010, Massasoit and Stonehill collaborated in applying for, and received a one-year grant of \$100,000 from the Lloyd G. Balfour Foundation for a project entitled, *Stonehill-Massasoit Community College Transfer Initiative*. This grant will be used to sustain the summer research program, funding summer stipends for students and faculty research, advising of and scholarships for Massasoit transfer students (and possibly Stonehill students if transfer admissions are low), career awareness seminars, student field trips, and a science transfer day.

As described earlier in this report, the culture in the science programs at Massasoit Community College has undergone a profound change, such that there is an increased emphasis on scholarly research for faculty and research experiences for students. The lead Massasoit faculty member on this STEP grant, Rachel Hirst, has begun to take steps towards applying for grants to make scientific research a reality at Massasoit. She, along with colleagues, submitted an application to attend a series of workshops on how to prepare proposals for NSF's Course, Curriculum and Laboratory Improvement (CCLI) grant program which has recently been extended to community colleges. In her application for the workshops, she articulated the following objectives: Continuing the Massasoit-Stonehill summer research program, incorporating research-like experiences in classroom settings, and creating a research culture on Massasoit's campus.

These efforts demonstrate institutional and faculty commitments to sustaining the collaborative partnership that has led to rich educational opportunities for science students at both institutions.

Findings

Stonehill College has successfully implemented *A Public-Private Partnership to Increase Enrollment, Retention, and Diversity in Chemistry, Biology, and Biochemistry* through its NSF-STEP grant for four years, and has systematically evaluated its effectiveness and made changes on the basis of those evaluations. At this point every aspect of the program is flourishing, and students at both institutions are benefitting from that. The students rave about the program, and the faculty are strongly invested in it and committed to providing a rich science education in the context of a supportive and nurturing environment.

The program is on target or ahead of targets in meeting many of its goals and objectives. Most important has been the increase of 24 percent in the number of science majors at Stonehill, exceeding the 20 percent goal. As can be seen in Table 14, Stonehill has fallen short of its goals in increasing diversity among science students. While the number of transfer students admitted to Stonehill falls short of the original goal, it should be noted that Massasoit science students are successfully transferring to and graduating from four year colleges at high rates.

Table 14. Project Outcomes

Outcome Measures	Year 1		Year 2		Year 3		Year 4	
	Expected	Achieved	Expected	Achieved	Expected	Achieved	Expected	Achieved
Increase in total Stonehill science students	0	31	13	64	41	103	90	174
Annual increase in underrepresented Students in sciences at Stonehill	0	2	3	1	8	2	16	15
Annual increase in science transfers to Stonehill	2	0	3	1	5	2	7	3

Recommendations

- 1. Schedule regular meetings among faculty who teach theme-based chemistry.**
During the focus group meeting with the faculty who taught the theme-based course it became apparent that many were experimenting with different class formats and other pedagogical techniques, and some found themselves interested in hearing about what their colleagues were doing. Given that this course is a work in progress, and also given the seeming collegiality and receptivity to new ideas that this group exhibits, regular meetings designed to exchange experiences might be useful.
- 2. Continue efforts to sustain this program.** Both Stonehill and Massasoit have done an excellent job of identifying ways to sustain this successful program beyond the funding period. In light of the demonstrated success of the AP lab component, the College should continue its efforts to find funding to sustain that initiative.

Table 8. NSF-STEP Advising/Mentoring Activities at Massasoit Community College

Challenges	Activities	Progress/End Products
<p>It is difficult to get students to attend events on campus.</p> <ul style="list-style-type: none"> • Massasoit students commute and have many outside obligations. • Many students are only on campus at night or two days a week. • Most students do not utilize their Massasoit email. • Faculty members have high course loads leaving them little time to recruit students to attend advising events. 	<ul style="list-style-type: none"> • Identified an interested student cohort • Faculty announced events in introductory science classes • Collected preferred email addresses of interested students and set up a distribution list to be used for advertising of upcoming events • Set up a Massasoit Science Transfer Facebook Page as a recruitment tool for fall 2010. • Applied for grant from Lloyd G. Balfour Foundation for a part-time advising position. Student recruitment will be part of the job description. 	<ul style="list-style-type: none"> • 30-45 students attending each event • Growing number of students on distribution list • Massasoit and Stonehill were awarded a one-year, \$100,000 grant from the Lloyd G. Balfour foundation which will provide money for a part-time LATS advising position.
<p>Students are not aware of the classes they should be taking before transferring.</p> <ul style="list-style-type: none"> • Many science transfer students are advised by non-science faculty. • It is difficult for science transfer students to find information that is specific for transfer in STEM majors. 	<ul style="list-style-type: none"> • Hosted a group advising event where science faculty were available to answer questions regarding course selection and transfer issues • Worked with the Dean of Student Advising and Assessment to change science transfer student advisors • Massasoit Science Transfer website which will contain information on transfer and opportunities for LATS students will debut in fall 2010. 	<ul style="list-style-type: none"> • Increased enrollments in second semester science courses • Transfer science students are now assigned science faculty advisors • Bulletin board available with transfer information
<p>Each transfer school requires and accepts different prerequisite courses.</p> <ul style="list-style-type: none"> • Transferability of courses at specific transfer schools is difficult to determine for students and faculty. • Many Massasoit transfer students do not contact their transfer institution 	<ul style="list-style-type: none"> • Prepared a science articulation agreement with our NSF-STEP partner, Stonehill College • Will provide transfer and advising information to faculty • Preparing an articulation agreement 	<ul style="list-style-type: none"> • Stonehill-Massasoit articulation agreement available online • Faculty advising training session occurred on May 18th, 2009 • Becky Packard came to speak to faculty regarding advising community college

Table 8. NSF-STEP Advising/Mentoring Activities at Massasoit Community College

<p>before transfer.</p>	<p>with Bridgewater State College</p> <ul style="list-style-type: none"> Invited STEM faculty from common four-year transfer institutions to discuss their programs and course requirements during the upcoming science transfer day. This event will also give students a contact person. 	<p>transfer students.</p> <ul style="list-style-type: none"> A science transfer day is scheduled for November 3rd, 2010 paid for by Balfour grant.
<p>Students are not aware of career options in science.</p> <ul style="list-style-type: none"> Many students are focused on being accepted into Massasoit's Nursing Education and Allied Health programs. 	<ul style="list-style-type: none"> Created a Career Options in Science pamphlet Made contact with seminar speakers to discuss science career opportunities in their field Field trips to biotech companies and common four-year institutions are being planned for the upcoming year. 	<ul style="list-style-type: none"> Pamphlet mailed home to students enrolled in introductory science classes Various seminar speakers have come discuss their career paths and/or science career opportunities Transportation for field trips will be paid for by the Balfour grant monies.
<p>Many transfer schools are not affordable for Massasoit students.</p>	<ul style="list-style-type: none"> Invited representatives from Massasoit's Advisement and Counseling Department to discuss scholarship opportunities Applied for an NSF S-STEM grant Applied for a grant from Lloyd G. Balfour Foundation 	<ul style="list-style-type: none"> Received an NSF S-STEM grant (\$600,000) that will provide 10 Massasoit transfer student scholarships upon transfer to Stonehill College. STEM Scholars pamphlet was created describing eligibility requirements and deadlines. Received a one year, \$100,000 grant that will fund additional STEM scholarships.
<p>It is difficult for community colleges to obtain funding for undergraduate research.</p>	<ul style="list-style-type: none"> Applied for a grant from Lloyd G. Balfour Foundation in collaboration with Stonehill College Massasoit faculty applied to a geared toward community colleges interested in creating and sustaining a research culture on their campuses. 	<ul style="list-style-type: none"> Balfour grant will provide money for 2 Massasoit faculty and 4 Massasoit students for the summer research program for the summer of 2011 If the group is chosen, they will attend the workshop at Southern Maine Community College from November 5-7, 2010 and will research funding opportunities.

Table 9. 2009-2010 Advising Events

Description	Attendance	Comments
All faculty teaching biological principles, general chemistry, introductory physics and college algebra talk to their students about science career opportunities, announce the types of activities that are being planned and collect email addresses of interested students.	N/A	I received 80 student names within the first 2 weeks of classes in addition to the students from the previous semester.
Students involved in summer research at Stonehill give a presentation for faculty and students discussing their research and their overall experience. This introduces students to possible research opportunities that are available for Massasoit students and demonstrates the types of activities that might occur in graduate school or in a research lab at a University or company.	7 students 18 faculty	We planned the event for a Thursday afternoon to accommodate the 2 hours, but our students have a difficult time attending events in the afternoons due to job and family obligations
Invite Tara Hennessey, Associate Director of Transfer and Graduate Admissions at Massachusetts College of Pharmacy and Health Sciences, to discuss the various program offered at their school.	44 students 12 faculty	Many allied health students attending and had specific questions. This seminar was provided a lot of useful information for student and faculty on programs offered. A representative was also available at Massasoit's transfer day.
Invite Dr. Becky Packard, Associate Professor of Psychology and Education at Mount Holyoke College, to discuss her research findings and practical tips for faculty and advisors about facilitating students for transfer success.	2 administrators 10 full-time faculty 4 adjunct faculty 8 professional staff	Dr. Packard gave a seminar at Stonehill in the morning geared toward four-year institutions and gave a presentation at Massasoit in the afternoon for advising transfer students. I received great feedback from Massasoit faculty.
Group advising event with science faculty before scheduling for the Spring semester to answer questions about course registration and transferring	18 students 10 faculty	There were mostly students interested in allied health. We feel that this event needs to be reworked to be successful in the future.
Private tour of Stonehill's facilities including the new Science Center for prospective STEM scholars. They will also meet with a representative from Admissions, Financial Aid, and Stonehill's transfer coordinator.	2 students	One student applied to Stonehill following this meeting and is one of the three STEM scholars. Another student couldn't attend this meeting, but followed up with Dr. Hirst and will attend Stonehill in the Fall of 2010 as a STEM scholar. The last STEM scholar transferred to Stonehill in the Fall of 2009 after one year at Massasoit.
All faculty teaching biological principles, general chemistry,	N/A	

Table 9. 2009-2010 Advising Events

<p>introductory physics and college algebra talk to their students about science career opportunities, announce the types of activities that are being planned and collect email addresses of interested students.</p> <p>Connie Philips, director of the Biomedical Laboratory & Clinical Sciences CityLab Academy at Boston University, will discuss opportunities for students interested in getting a certificate or degree in biotechnology or biomedical science. She will provide information about the free two-semester, college education program in biotechnology and biomedical science at Boston University (CityLab Academy) and the BLCS program (B.S. program), which provides real experience in a lab or another position in the biomedical sciences, including clinical research.</p>	<p>11 students 12 faculty</p>	<p>Dr. Hirst was on maternity leave and was unable to recruit students to attend except via email.</p>
<p>Kim Welty, the project coordinator for the Robert Noyce Teaching Scholarship Program at the University of Massachusetts at Dartmouth, will come to talk to LATS students. This scholarship is funded by a 5-year NSF grant and it seeks to recruit math and science undergraduates to become middle and high-school math and science teachers in local, high-need school districts.</p>	<p>5 students 4 faculty</p>	<p>The speaker cancelled last minute and we rescheduled her for this date. Therefore, many faculty couldn't attend due to prior engagements and there wasn't a lot of time to recruit students.</p>
<p>Massasoit STEM Careers for Women discussion panel. Hosted by Chritina Ajemian and funded by the American Association of University Women (AAUW)</p>		<p>Dr. Hirst met with the group, provided a template for the pamphlet and helped recruit three students to work on the required research.</p>
<p>Seminar by Karl Kuban, a Professor of Pediatrics and Neurology at Boston University and the Chief of the Division of Pediatric Neurology at Boston Medical Center. He will discuss his career path and what his job is like on a day to day basis.</p>	<p>48 students 9 faculty</p>	<p>Students found this speaker extremely motivational.</p>
<p>Dr. Hirst presented at New England Biology Association of Two-Year Colleges (NEBATYC) a workshop session entitled <i>The Benefits of Two-Year/Four year College Partnerships</i></p>	<p>5 attendees</p>	<p>Discussed the Massasoit-Stonehill partnership and provided other community college faculty ideas for how they could start undergraduate research at their institution.</p>

Table 9. 2009-2010 Advising Events

Massasoit faculty applied to attend a conference funded by the NSF and coordinated by CUR and NCIA. The workshop is geared toward community colleges who are interested in creating and sustaining a research culture on their campuses.	1 administrator 3 STEM faculty	Dr. Hirst applied as the team leader and Drs Twomey and Bolduc will participate as members if the group is chosen. We hope to get ideas for funding opportunities to help continue the summer research program and to incorporate research-like experiences in courses offered at Massasoit.
Summer research opportunities for selected Massasoit students at Stonehill originally funded by the NSF-STEP grant and eventually by other funding sources	6 students	Four out of the six had attended at least one advising event.

A total of **114** unique students attended at least one advising seminar or event.