

IGEP Yearly Reports for 2012-2013

- 10 existing IGEPs (GBCB, MACR, SuN, WATER, TPS, MultiSTEPS, TOR, RM, RS, CTE)
- 3 new IGEPs starting fall 2013 (IGC, Bio-Build, HCD)
- The new IGEPs have provided their criteria for sustainability. Each new IGEP will be evaluated on their own criteria for sustainability.
- The existing IGEPs have provided their yearly reports (except GBCB).
- A total of 13 IGEPs currently funded.

GRAD 5134 courses for CY 2012-2013:

Fall 2012:

- Water INTERface: INTERdisciplinary Research Transcending Boundaries of Engineering, Science, and Human Health (in collaboration with the SuN IGEP)

Students enrolled: 8 students

Faculty: Brenda Davy, Joe Falkinham

- Sustainable Nanotechnology (in collaboration with the WATER IGEP)

Faculty: Peter Vikesland, Amy Pruden

Students enrolled: 6 students

- Interdisciplinary Research in Biotransport

Faculty: Rafael Davalos, Jeffrey Kuhn, Pavlos Vlachos

Students enrolled: 5 students

Spring 2013:

- Regenerative Medicine: Science and Society

Students enrolled: 11

Faculty involved: Linda Dahlgren (Vet Med), Abby Whittington (MSE), Ashley Shew (STS)

- Translational Plant Sciences

Students enrolled: 9

Faculty involved: John McDowell (PPWS)

Fall 2013:

- Interdisciplinary Research: Engineering-Biology Interface (MultiSTEPS)

Faculty involved: Mark Stremmer, Daniela Cimini

- Polymers in Medicine

Faculty involved: Judy Riffle

Interdisciplinary Graduate Education Programs (IGEPs) Report

I. Student Enrollment

Cohort #1 (WATER, MSTP, TPS, SuN, MACR, GBCB – CY 2011-2012, CY 2012-2013 & CY 2013-2014)

IGEP ID	Students on IGEP Funding	*Affiliated Students	New Students	Returning Students	Total Students
WATER	13	7	2	18	20
MSTP	11	14	6	19	25
TPS	10	28	N/A	N/A	38
SuN	9	8	3	14	17
MACR	10	33	10	33	43
GBCB	20	24	N/A	N/A	44
Total	73	114			187

*Affiliated students reported by IGEP faculty. Students are affiliated with the IGEP but not receiving funding. MSTP affiliated students are IGERT students. TPS affiliated students are from Molecular Plant Sciences (MPS). MACR and GBCB affiliated students are all the students in these two established programs.

Cohort #2 (CTE, TOR, RM, RS – CY 2012-2013 & CY 2013-2014)

IGEP ID	Students on IGEP Funding	*Affiliated Students	New Students	Returning Students	Total Students
CTE	5	N/A	3	2	5
TOR	6	8	N/A	N/A	14
RM	8	9	N/A	N/A	17
RS	5	13	N/A	N/A	18
Total	24	30			54

*More affiliated students reported.

Cohort #3 (IGC, Bio-Build, HCD –CY 2013-2014)

IGEP ID	Students on IGEP Funding	*Affiliated Students	New Students	Returning Students	Total Students
IGC	2	N/A	N/A	N/A	2
Bio-Build	2	N/A	N/A	N/A	2
HCD	2	N/A	N/A	N/A	2
Total	6				6

Total Student Enrollment

IGEP ID	Students on IGEP Funding	*Affiliated Students	New Students	Returning Students	Total Students
WATER	13	7	2	18	20
MSTP	11	14	6	19	25
TPS	10	28	N/A	N/A	38
SuN	9	8	3	14	17
CTE	5	N/A	3	2	5
TOR	6	8	N/A	N/A	14
RM	8	9	N/A	N/A	17
RS	5	13	N/A	N/A	18
IGC	2	N/A	N/A	N/A	2

Bio-Build	2	N/A	N/A	N/A	2
HCD	2	N/A	N/A	N/A	2
Total w/o MACR & GBCB	73	87			160
MACR	10	33	10	33	43
GBCB	20	24	N/A	N/A	44
Total	103	144			247

II. Course Enrollment per IGEP

- WATER IGEP

1) CEE 5984: Ethics in Engineering, Science, and Public Policy (3 credits) - Fall 2011

Faculty: Marc Edwards, Yanna Lambrinidou

Students enrolled: 13 students

2) CEE/FST/HNFE 5984: Water for Health Interdisciplinary Seminar (1 credit) - Spring 2012

Faculty: Andrea Dietrich, Sean O'Keefe, Brenda Davy

Students enrolled: 13 students

3) GRAD 5134: Water INTERface: INTERdisciplinary Research Transcending Boundaries of Engineering, Science, and Human Health (in collaboration with the SuN IGEP) – Fall 2012

Faculty: Brenda Davy, Joe Falkinham

Students enrolled: 8 students

- MSTP IGEP

1) GRAD 5134: Engineering-Biology Interface (3 credits) – Fall 2011

Faculty: Mark Sremler, Pavlos Vlachos

Students enrolled: 3 students

2) GRAD 5134: Interdisciplinary Research in Biotransport (3 credits) – Fall 2012

Faculty: Rafael Davalos, Jeffrey Kuhn, Pavlos Vlachos

Students enrolled: 5 students

- TPS IGEP

1) GRAD 5134: Translational Plant Science (3 credits) – Spring 2013

Faculty: John McDowell

Students enrolled: 9 students

- SuN IGEP

1) GRAD 5134: Sustainable Nanotechnology (3 credits) (in collaboration with the WATER IGEP) – Fall 2012

Faculty: Peter Vikesland, Amy Pruden

Students enrolled: 6 students

- MACR IGEP

1) GRAD 5134: Polymers in Medicine and Biology (3 credits) – Fall 2011

Faculty: Judy Riffle, Abby Whittington, Richie Davis, Kevin Edgar, Tim Long

Students enrolled: 19

2) GRAD 5134: Polymers in Medicine and Biology (3 credits) – Fall 2013

- GBCB IGEP

1) **GBCB 5874 Problem Solving in GBCB-** approved by Dean DePauw as equivalent to the GRAD 5134 (3 credits) – Fall 2012

No information available about enrollment.

- CTE IGEP

1) **GRAD 5134 will be taught by year 3 of the program.**

- TOR IGEP

1) **GRAD 5134 will be taught in Fall 2014**

2) **HNFE 6984: Introduction to Teach Science – Spring 2013**

Faculty: Paul Estabrooks

- RM IGEP

1) **GRAD 5134: Regenerative Medicine: Science & Society – Spring 2013**

Faculty: Ashley Shew, Linda Dahlgren, Abby Whittington

Students enrolled: 11 students

Summary:

GRAD 5134 student enrollment: 42

Other IGEP related courses: 26

+ GBCB 5874 students

III. Publications, presentations, grants, etc per IGEP (Cohort #1)

IGEP	Presentations and abstracts	Publications	Funded Grants	Grants Submitted	Outcomes, Benchmarks, Graduates
WATER	41	24	13	2 (IGERT under consideration)	<p>15 students by year 3 4 PhD graduates by May 2014 2 IGEP PhD and 3 MS students graduated in May 2013 Fall 2012 – CEE 5984 Ethics: Enrolled 18 Spring 2013 - Water Seminar: Enrolled 13 Fall 2012 – GRAD 5134: Enrolled 8 (14 total, combined with Sun IGEP group); all first and second year water IGEP-supported students enrolled, with one exception. 100% of second-year IGEP students have assembled a dissertation advisory committee that includes at least two Water INTERface faculty Two IGEP students have completed GRAD 5974 Indep Study, to date (Masters, Rhoads) Student Manuscripts: 3 published, 1 accepted, 2 under review Student Presentations: 21 2 IGEP PhD and 3 MS students graduated in May 2013 The program goal for sustainability is to fund 40-50% of water IGEP students through external sources by the third year of this IGEP (2013-2014) Degree-program request: A title and degree concept statement for the water IGEP was submitted to Dr. Blieszner (2-9-11), for consideration by the graduate school on the institution's "wish list" of future graduate degrees. Proposed start date of the "Water for Health" PhD degree program: Fall 2013. IGEP core faculty and departments were listed on this concept statement A graduate certificate in "Water and Health Sciences" has been approved (Spring 2013), and will be available to students who complete the 9-credits of water INTERface coursework and submit a certificate request Initiated Quarterly Program Newsletter: https://blogs.lt.vt.edu/water/newsletters/</p>
MSTP	28	16	10	14	<p>GRAD 5134 - Fall 2011, Fall 2012 & Fall 2013 IGEP/IGERT combined efforts Second-year trainees are required to take GRAD 5134 Interdisciplinary Research: Engineering-Biology Interface. Required reading for this course includes "Made To Stick" by Cohen & Cohen, a NY Times bestseller on effective communication. This course includes activities in defining and describing interdisciplinary research and instruction in preparing research proposals MultiSTEPS research rotations are proving to be an effective means of preparing trainees for conducting collaborative interdisciplinary research. In their first year, trainees conduct three research rotations lasting approximately 8 weeks each. One of these rotations must be in the biological sciences and one must be in the engineering sciences</p>
TPS	Talks by students: 4 Posters by students: 44 Total: 48	42	\$23,152,942 (no number of funded grants, just \$ amounts)	\$12,470,196	<p>38 students in program TPS/MPS 2011-2013 (5 PhD + 1 MS) degrees conferred Awards: Six students received awards for travel to conferences from external funding sources; One was</p>

					<p>awarded the equivalent of “Best Student” in his departments; one was awarded a graduate fellowship</p> <p>Outreach activities: 12 students participated. Seven contributed to primary or secondary school outreach (generally in the Partnership for Research and Education in Plants). Four mentored summer undergraduate researchers (e.g., from the VT-MAOP program)</p> <p>Interdisciplinary collaborations: 10 of the faculty reported a total of 13 interdisciplinary collaborations. These involved interaction with computer scientists, chemists, physicists, engineers, entomologists, ecologists, and agronomists</p> <p>Recruiting: organized recr. weekend attended by 14 undergraduates</p> <p>Mini-symposium: The TPS program organized a one-day mini-symposium at the Inn at Virginia Tech, which was attended by 90 faculty, students, postdocs, and staff. The highlight of the program was keynote presentations from three internationally recognized speakers (Univ. of Penn, Univ. of Minnesota, Univ. of California, Irvine)</p> <p>AREC tour: 12 students and 3 faculty participated in the third annual Agricultural Research and Extension Center (AREC)-Ag Industry Tour on August 21-23 2012. This tour is designed to provide students with a broad perspective of public- and private sector activities in Virginia Agriculture</p> <p>GRAD 5134 – Translational Plant Science Course: The inaugural offering of this course took place in Spring 2013. Nine students enrolled. The course was well received, as evidenced by positive student evaluations (overall rating of 5.83/6). The course will be offered again in the Spring Semester of 2014</p>
SuN	40	25	6	11	<p>Total of 14 students - IGEP students making progress</p> <p>GRAD 5134: Sustainable Nanotechnology was taught in Fall 2012 with six students enrolled. The class was taught at the same time as GRAD 5134: WaterINTERface. Co-teaching of the class by the two IGEPs facilitated interdisciplinary learning and exchange. It is planned to co-offer the course again either in Spring or Fall 2014</p> <p>The Sustainable Nanotechnology certificate program is currently being finalized for submission through the proper channels</p> <p>Recruiting: IGEP funds have provided support to recruit two Ph.D. students in Fall 2012, one Ph.D. student in Spring 2013, and four new offers of support for Fall 2013. During Spring 2013 IGEP funds were utilized to produce promotional pamphlets and support development of a compelling webpage</p> <p>SuN IGEP Community: The SuN IGEP meets roughly every two weeks for the SuN IGEP seminar series. This series of seminars was initiated in Fall 2011 and typically entails one member of the IGEP group giving a presentation about their Sustainable Nanotechnology research. Speakers from outside the SuN IGEP are regularly asked to come</p> <p>Outreach: The SuN IGEP blog (https://blogs.lt.vt.edu/sustainablenano/) is live. Additional posts by students and faculty have been solicited and will be posted once they have been vetted</p>

					<p>The SuN IGEP and VT SuN are heavily involved in a collaborative effort with the <i>Woodrow Wilson Center</i> to update the Nanomaterial Consumer Product Inventory (www.nanotechproject.org/inventories/consumer/).</p> <p>SuN IGEP Director Vikesland has been asked to take part in the development of the <i>Sustainable Nanotechnology Organization's</i> (www.susnano.org) graduate and undergraduate education program. This effort will draw heavily upon the lessons learned in the SuN IGEP's graduate education program.</p> <p>Four of the SuN IGEP faculty have led an effort to include Virginia Tech as a node in the Next Generation Nanotechnology Infrastructure Network (NG NNIN). This multi-institution network facilitates access to cutting-edge research infrastructure. The current NNIN (www.NNIN.org) Director, Roger Howe (Stanford), visited Virginia Tech on Feb. 4 and met with SuN IGEP students and faculty.</p> <p>1 IGEP student graduated in Fall 2012</p>
MACR	164	103 Book chapters: 8	72	39	<p>Total students: 43</p> <p>39 PhD, 4 MS studying under 10 major professors in 3 colleges and 5 departments</p> <p>67 degrees granted (55 PhD + 12 MS)</p> <p>Students employed in U.S. industry, University teaching or post-doc positions, and in government or national labs</p>
GBCB	40 As reported by students	97 As reported by students	N/A	N/A	<p>Total students: 44</p> <p>Total students graduated: 42 since 2004</p> <p>Students submit progress reports in Scholar to Dennie</p>
Total	361	315	101	66	

IIIa. Publications, presentations, grants, etc per IGEP (Cohort #2)

IGEP	Presentations and abstracts	Publications	Funded Grants	Grants Submitted	Outcomes, Benchmarks, Graduates
TOR	80	57	23	N/A	<p>Total students enrolled: 14</p> <p>Fall 2012 HNFE 6064: Enrolled 13</p> <p>Spring 2013 HNFE 6984: Enrolled 18</p> <p>*GRAD 5134 will be offered in Spring 2014</p> <p>100% of Year 1 IGEP students have assembled a dissertation advisory committee that includes at least two TOR IGEP faculty members</p> <p>Student presentations: 16</p> <p>Student proposals: 2</p> <p>The Fralin Translational Obesity Research Center was approved by the Office of the Vice President for Research.</p> <p>The First Biennial Fralin Translational Obesity Research Center Conference was held at the Inn at Virginia Tech on June 17th and 18th, 2013. There were 80 attendees.</p>
RM	29	51	4	3	<p>Total students enrolled: 17</p> <p>GRAD 5134 – Spring 2013 We learned so much from one another in our first year, and we have spin-off collaborations between people not just Vet Med and Engineering (which already existed to some degree and is perhaps less remarkable), but also between Business and Engineering, STS and Vet Med, and Business and STS. The students from these disciplines have gelled</p>

					<p>together such that they have their own interdisciplinary projects.</p> <p>Social programs – Journal Club and Faculty Seminars – to encourage interdisciplinary interaction between both faculty members and students.</p> <p>We experienced great participation in our inaugural journal club run in Fall 2012. It was a useful introduction for many of us into the array of topics covered by the label “Regenerative Medicine” and to the nature of our interdisciplinarity.</p> <p>We hosted kick-off, mid-year, and end-year gatherings of students and faculty.</p> <p>Examples of student success: Jerry Flynn, Business student, and Keith Johnson, STS student, have already presented work together on intellectual property of biotech and are working on a paper.</p> <p>Engineering and STS: Shelley Cooke, Engineering student, has presented work on breast cancer survivors.</p>
RS	76	42	19	11	<p>Total students enrolled: 18</p> <p>Awards & Service: <i>Gopalakrishnan R.</i>, Recipient of the Sigma Xi award from the VT chapter of Sigma Xi, the scientific research society. Award Amount: \$1000.</p> <p><i>Henderson, J.</i>, Served on the Derecho Service Assessment Team for the National Weather Service. July 12-18, 2012. Social Scientist.</p> <p><i>Henderson, J.</i>, National Weather Association Social Impacts Committee (2012-2015). Graduate Student Committee Representative.</p> <p><i>Henderson, J.</i>, National Weather Service Integrated Warning Team. October 2012, Greensboro, North Carolina.</p> <p><i>Henderson, J.</i>, National Weather Service Integrated Warning Team. April 2013, Raleigh, North Carolina.</p> <p><i>Henderson, J.</i>, \$5000 NSF funding to attend the AMS Policy Colloquium in Washington, DC. June 3-12. One of 25 attendees selected.</p> <p><i>Henderson, J.</i>, Virginia Tech Travel Fund. Fall 2012. Award Amount: \$500.</p>
CTE	11	14	N/A	15	<p>Total students enrolled: 5</p> <p>Education & Outreach: June – August 2012: Dr. R.F. Helm, Dr. T.M. Murali and Dr. P. Rajagopalan, mentored and designed on a 10-week undergraduate research program funded by our NSF grant (ABI Innovation: Bridging the Gap between the Transcriptome and the Proteome to Study Inter-cellular Signaling). This is a REU experience where we fund four students to rotate between our research groups to get experience on how tissue engineering, proteomics and computational predictions converge.</p> <p>July 2012: Dr. P. Rajagopalan conducted a week-long activity for C²Tech. Twelve female high school students spent a week in her laboratory working on an assignment on cell-biomaterial interactions.</p> <p>In Fall 2012, a lunch social was organized and held in Life Sciences 1. All faculty and students in the IGEP attended. After the lunch, Dr. Rich Helm gave a tour of the Mass Spectrometry facility.</p> <p>Dr. D. Zallen has been in discussions with other IGEP faculty on the scope of new modules she plans to</p>

					<p>introduce in her Bioethics course. She plans to include modules relevant to computational tissue engineering.</p> <p>Evaluation: As our cohort of students becomes larger, we will work with Steve Culver to conduct an assessment on progress on program-specific goals. We will conduct a survey this academic year.</p> <p>Website: Our goal is to have a CTE-IGEP website designed by the early part of Fall 2013.</p>
Total	196	164	46	29	
Grand Total	557	479	147	95	

IV. IGEP proposals received, faculty involved, departments, colleges, and proposals funded

Fall 2011

Proposals received: 17

Faculty involved: 183

Departments: 56

Colleges: 7

Initially, three IGEPs were to be funded but thanks to the generous support of Fralin Life Sciences Institute, four IGEPs are funded. Two existing programs: GBCB and MACR joined the IGEPs. The IGEP proposals awarded for Fall 2011 are:

- Sustainable Nanotechnology (SuN)
- Translational Plant Science (TPS)
- WaterINTERface (WATER)
- MultiSTEPS (MSTP)

Fall 2012

Proposals received: 19

Faculty involved: 227

Departments: 58

Colleges: 8

Three IGEPs were to be funded for the 2nd round but thanks to the generous support of ICTAS, four new IGEPs are funded. The IGEP proposals awarded for Fall 2012 are:

- Translational Obesity Research (TOR)
- Regenerative Medicine (RM)
- Remote Sensing (RS)
- Computational Tissue Engineering (CTE)

Fall2013

Proposals received: 18

Faculty involved: 256

Departments: 56

Colleges: 8

Out of the 18 proposals, 6 proposals are resubmissions from last year.

Proposals that will be awarded for Fall 2013 were announced in Spring 2013.

- Interfaces of Global Changes (IGC)
- Bio-Inspired Buildings (Bio-Build)
- Human Centered Design (HCD)

Summary:

Total proposals received: 54

Total IGEPs: 10 + 3 (to be funded in fall 2013) = 13