ANNUAL REPORT: June 1, 2011 – May 31, 2012
(i.e., Summer 2011, AY 2011-2012)
DEPARTMENT OF ENVIRONMENTAL AND FOREST BIOLOGY
SUNY-ESF

NAME: _____Lee A Newman_____

I. INSTRUCTIONAL ACTIVITIES

1. Regular Course Offerings

	Course No.	Title	Credit Hrs.	No. Students	No. of Lab. Sections
SUMMER:					
FALL:	BTC 401	Molecular Techniques	4	20	2
	EFB 601	Molecular Techniques	4	4	1
SPRING:	EFB 325	Cell Biology	3	90	0
	BTC 499	Senior Synthesis	1		0

NOTE: PLEASE INDICATE WHICH COURSE(S) HAD A SERVICE-LEARNING COMPONENT AND BRIEFLY EXPLAIN THE NATURE OF THIS COMPONENT.

No classes had a service-learning component

2. Non-Scheduled Course Offerings (e.g., 496, 899, 999)

	Course No.	Title	No. Students
FALL:	EFB 999	Doctoral Thesis Research	1
	EFB 899	Masters Thesis Research	1
	EFB 495	Undergrad Exp/ College Teaching	2
	EFB 498	Research Problems in Envir. For. Bio	1
	BTC 498	Research Problems in Biotechnology	8
	BTC 420	Internship in Biotechnology	2
SPRING:	EFB 999	Doctoral Thesis Research	1
	EFB 899	Masters Thesis Research	1
	EFB 495	Undergrad Exp/ College Teaching	1
	BTC 498	Research Problems in Biotechnology	9
	EFB 498	Research Problems in Envir. For. Bio	3
	EFB 496/796	Phytoremediation	10
	BTC 420	Internship in Biotechnology	1

3. Continuing Education and Extension (short courses, workshops, etc.)

None at this time

4. Guest Lecture Activities

	Course No.	Title	No. of Lectures
FALL:	BTC 132	Orientation Seminar	1
SPRING	EFB 211	Diversity of Life II	3
	EFB 296	Human Sexuality	1
	EFB 414	Con Bio Sr. Synthesis	1
	EFB 797	Hydrological and Biogeochemical Processes	1
	CIE472/672	Applied Environ. Microbiology	1

II. STUDENT ADVISING

A. Number of undergraduates for whom you are the student's official advisor _____ and unofficial advisor _____

I currently have 26 undergraduate students for which I serve as academic advisor.

Over the course of the past two semesters I have had 13 undergraduate students (9 of whom I am academic advisors to) who are conducting research in my laboratory:

Beverly Agtuca	Anna Yim
Joseph Whitaker	Melody Papapietro
Michael Cook	Funmi Afelumo
Jonathon Cooke	Arashdeep Dhillon
Robert Hamilton	Justin McMullen
Gabrielle Fanfan	Cherissa Dukelow
Vic Maietta	

B. Graduate Students: (Name, degree sought, starting date, month & year; if a degree was completed, please give date and full citation for the thesis or dissertation).

MAJOR PROFESSOR

Name	Degree	Start Date
Adam Hoffman	Ph.D	8/2010
Wenjun Cai	M.S.	6/2011
Scott Wolcott	Ph.D	1/2012

Mr. Wolcott is currently a Ph.D. student in Environmental Science, but is switching to an Environmental Resource Engineering major. Although I am not a member of the ERE department, the Department Chair has approved my being the major professor. The mechanism by which this will be done (joint appointment with ERE, joint advising with ERE) is still being worked out.

CO-MAJOR PROFESSOR

None at this time

MEMBER, STEERING COMMITTEE (other than those listed above)

Allison Oaks
Leticia Izquierdo

CHAIRMAN OR READER ON THESIS EXAMS, ETC.

Tian Zhou
Jianfeng Wen
Qin Wang
Laura Calandra
Chengjun Zhu

III. RESEARCH COMPLETED OR UNDERWAY

Please see section IX.B.1.b. for detailed descriptions of all research projects.

A. Departmental Research (unsupported, boot-legged; title - % time spent)

Safeners and metal toxicity protection	4
Role of plant endophytes on growth promotion	4
Role of P450 genes in TCE degradation	4
We submitted an NSF grant in February for this project.	
Impact of nanoparticles phyllosphere organisms	4
We plan to submit a USDA grant in September for this project.	
Impact of nanoparticles on epidermal symbiotes	4

B. 1. Grant-supported Research (source, subject, amount - total award and current year, award period starting and ending dates; list graduate research assistants supported by each grant)

Source	**Title**			**Role**
Total Amount	**Sub Amount**	**Current Year Amount**	**Award Period**	**Students**
USDA	Nanoparticle contamination of agricultural crop species			PI
$1,498,080	$381,026	$72.56	Mar 11-Mar 16	Wenjun Cai
NASA	Development of Hyperspectral Imaging of Plants to Detect Contamination			PI
$182,829		$73,183	Mar 11-Mar13	Adam Hoffman
NSF	Plant Uptake and Interaction with Nanoparticles			PI
$277,907		$74,878	Sept 08– Sept 12	None at this time

2. Research Proposals pending (include information as in B.1., above).

Source	**Role**	**Title**	**Total Amount**
NSF	PI	Understanding and Using the Genetic Mechanism for Phytoremediation of Chlorinated Solvents – Environmental and Societal Impacts	$363,131.00
NSF	CoPI	Simultaneous Nitritation, Anammox, and Denitrification in Vertical Flow Subsurface Wetlands	$332,832.00
NSF	CoPI	Mapping Plant Cell Wall Interactions through Genomically Driven Spectroscopy	$587,331.00
NSF	CoPI	NMR Spectroscopy of Intact Plant Cells: A Route to Identifying Cell Wall Synergies	$588,454.00

3. Research Proposals submitted, but rejected (include information as in B.1, above)

Agency	**Title**	**Role**	**Amount**
Mcintire-Stennis	Understanding the Role of Select Endophytic Bacteria in Enhanced Growth and Disease Resistance	PI	

IV. PUBLICATIONS (Full bibliographic citation, i.e., do not use "with Jones," or "Jones, et al."; please list only publications published, in press, or actually submitted during this reporting period --- **do not list manuscripts in preparation**).

A. Refereed Publications

1. Rogers, A., K. McDonald, M.F. Muehlbauer, A. Hoffman, K. Koening, L. Newman, S. Taghavi and D. van der Lelie. 2012. Inoculation of hybrid poplar with the endophytic bacterium *Enterobacter* sp. 638 increases biomass but does not impact leaf level physiology. Global Change Biology Bioenergy. 4:364-370.

2. Sabo-Attwood, T., J.M. Unrine, J.W. Stone, C.J. Murphy, S. Ghoshroy, D. Blom, P.M. Bertsch, and **L.A. Newman**. 2012. Uptake, distribution, of gold nanoparticles in tobacco (*Nicotiana xanthi*) seedlings. Nanotoxicology.6:353-360.

3. Odom, L., J. Burken and L.A. Newman. 2012 Distribution and accumulation of trichloroethylene and trichloroacetic acid in hybrid poplars. Ecological Engineering. Accepted.

4. De La Torre-Roche, R., J. Hawthorne, Y. Deng, B. Xing, W. Cai, L. A. Newman, C. Wang, X. Ma, J. C. White. 2012. Fullerene-enhanced Accumulation of *p,p'*-DDE in Agricultural Crop Species. Environmental Science and Technology. Submitted.

B. Non-refereed Publications

Jones, K.W., R. Tappero, J. Wang, Y-c. Chen, Q. Yuan, W. B. Lindquist, L. Crandell, C. A. Peters, W. Um, L. Newman, T. Sabo-Attwood, and C. Moyer. Tomographic Investigations Relevant to the Rhizosphere. In: "Tomography and Imaging of Soil-Water-Root Processes. 2nd edition", S. H. Anderson and J. W. Hopmans (Editors), Soil Science Society of America. In press**.**

C. Papers Presented at Science Meetings (give title, date, occasion, and location)

Invited talks – **Bold** indicates international venue, *Italics* indicates plenary or keynote talk

- Plant Uptake and Translocation of Gold Nanoparticles. The 27th Annual Conference on Soils, Sediments, Water and Energy, 17-20 October 2011.
- Plant Uptake and Translocation of Gold Nanoparticles. 8th International Phytotechnology Society Meeting, 13-16 September 2011.
- *Phytotechnology Education*. 8th International Phytotechnology Society Meeting, 13-16 September 2011.
- Phytoremediation and Urban Gardening: The Public Health Implications of Community Involvement. 8th International Phytotechnology Society Meeting, 13-16 September 2011.
- Phytoremediation and Urban Gardening: The Public Health Implications of Community Involvement. Sustainable Remediation Symposium, Amherst, MA, 1-3 June 2011.
- Using plants to solve environmental Problems. Central New York Biotechnology Symposium, Syracuse, NY 2-3 June 2011

Poster

- Uptake and translocation of gold nanoparticles by plants. **Newman, L.,** T. Sabo-Atwood, F. Palomba, S. Ghoshroy, C. Murphy, J. Stone, J. Unrine, R. Ferrieri, B. Babst and Ryan Tappero. Gordon Conference on Environmental Nanotechnology. , Waterville Valley, NH. 29 May -2 June 2011

Talks by colleagues or students – *italics* indicates student

- *Mechanisms and applications of plant growth promoting bacteria van der Lelie, D., S. Taghavi,. J. Vangronveld and **L. Newman**. Central New York Biotechnology Symposium, Syracuse, NY. 3 June 2011.

Posters by colleagues or students – *italics* indicates student

- Using endophytic bacterium *Enterobacter* sp. 638 to promote root growth in American Chestnut (*Castanea dentata*) cuttings. *Yim, A.,* A. Hoffman, W.A. Powell, and L. Newman. 2012 Biotechnology Symposium, Syracuse, NY. 21-22 May 2012
- Emerging Technologies in Phytoremediation: Hyperspectral Imaging. *Hoffman, A.*, D. Lewis, A. Keith, *R. Hamilton*, and L. Newman. 2012 Biotechnology Symposium, Syracuse, NY. 21-22 May 2012
- Fate and transport of gold nanoparticles in soils by Tomato (*Lycopersicon esculentum* 'Brandywine'). *Agtuca, B., W. Cai*, J. White, C. Murphy and L. Newman. 2012 Biotechnology Symposium, Syracuse, NY. 21-22 May 2012
- The potential for herbicide safeners to reduce the symptoms of heavy metal toxicity in *Zea mays*. *Afelumo, F.* and L. Newman. 2012 Biotechnology Symposium, Syracuse, NY. 21-22 May 2012
- Trichloroethylene Degradation by genetically modified Tobacco (*Nicotiana tobaccum var. xanthi*) *Hamilton, R., A. Hoffman, J. Cooke, S. Strycharz* and L Newman. 2012 Biotechnology Symposium, Syracuse, NY. 21-22 May 2012
- Impact of uncoated Ag NP, citrate-coated Ag NP, and bulk Ag particles on tomato biomass and transpiration. *Cai , W., V. Maietta, B. Agtuca*, J. White, and L. Newman. 2012 Biotechnology Symposium, Syracuse, NY. 21-22 May 2012.
- Using endophytic bacterium *Enterobacter* sp. 638 to promote root growth in American Chestnut (*Castanea dentata*) cuttings. *Yim, A., A. Hoffman,* W.A. Powell, and L. Newman. 2012 ESF Spotlight on Research, Syracuse, NY. 11-12 April 2012.
- Emerging Technologies in Phytoremediation: Hyperspectral Imaging. *Hoffman, A.*, D. Lewis, A. Keith, *R. Hamilton*, and L. Newman. 2012 ESF Spotlight on Research, Syracuse, NY. 11-12 April 2012.
- Commensalistic Human Skin Bacteria and their Sensitivity to Silver Nanoparticles Found in Consumer Products. *Dhillon, A.K.*, V. Shah *J. McMullen* and L. Newman. 2012 ESF Spotlight on Research, Syracuse, NY. 11-12 April 2012.

- Fate and transport of gold nanoparticles in soils by Tomato (*Lycopersicon esculentum* 'Brandywine'). *Agtuca, B., W. Cai*, J. White, C. Murphy and L. Newman. 2012 ESF Spotlight on Research, Syracuse, NY. 11-12 April 2012.
- The potential for herbicide safeners to reduce the symptoms of heavy metal toxicity in *Zea mays*. *Afelumo, F*. and L. Newman. 2012 ESF Spotlight on Research, Syracuse, NY. 11-12 April 2012.
- Growth Enhancement of Brandywine Tomato by the Endophyte *Enterobacter* sp. 638. *Papapietro, M., A. Hoffman,* D. van der Lelie, S. Taghavi and L. Newman. 2012 ESF Spotlight on Research, Syracuse, NY. 11-12 April 2012.
- Bioaccumulation of Silver Nanoparticles in Tobacco Hornworms. *Cooke, J.*, J. White and L. Newman. 2012 ESF Spotlight on Research, Syracuse, NY. 11-12 April 2012.
- The Effects of Titanium, Zinc, and Gold Nanoparticles on Commensalistic Human Skin Bacteria. *McMullen, J., A. Hoffman, A. Dhillon*, and L. Newman. 2012 ESF Spotlight on Research, Syracuse, NY. 11-12 April 2012.
- Silver Nanoparticle Effects on Brandywine Tomatoes (*Lycopersicon esculentum* 'Brandywine') *Whitaker, J., G. Fanfan, M. Papapietro* and L. A. Newman. 2012 ESF Spotlight on Research, Syracuse, NY. 11-12 April 2012.
- Trichloroethylene Degradation by genetically modified Tobacco (*Nicotiana tobaccum var. xanthi*) *Hamilton, R., A. Hoffman, J. Cooke, S. Strycharz* and L Newman. 2012 ESF Spotlight on Research, Syracuse, NY. 11-12 April 2012.
- The use of silver nanoparticles as herbicides: a study of Brandywine tomatoes (*Lycopersicon* 'Brandywine'). *Whitaker, J., M. Papapietro* and **L. Newman**. Eight International Phytotechnology Conference, Portland, OR, 13-16 September 2011
- Evaluation of the Ability of Safeners to Reduce the Symptoms of Heavy metal Toxicity in *Nicotiana tobaccum* and its Potential Use as an Effective Treatment for Phytoremediation. *Afelumo, F* and **L.A. Newman**. Eight International Phytotechnology Conference, Portland, OR, 13-16 September 2011
- Trichloroethylene Metabolism by Genetically Modified Tobacco (*Nicotiana xanthi*). *Hamilton, R, A. Hoffman, J. Cooke,* and **L. Newman**. Eight International Phytotechnology Conference, Portland, OR, 13-16 September 2011
- Fate and Transport of Gold Nanoparticles in Soil Containing Tomato (*Lycopersicon* Brandywine) *Agtuca, B.*, J. White, and **L. Newman**. Eight International Phytotechnology Conference, Portland, OR, 13-16 September 2011
- Emerging Technologies for Phytoremediation: Hyperspectral Imaging, *Hoffman, A.*, D. Lewis, A. Keith, *R. Hamilton* and **L. Newman**, Eight International Phytotechnology Conference, Portland, OR, 13-16 September 2011
- Growth Enhancement of Poplar (*Populus deltoides* x *nigra* OP-367) by Endophytic Bacteria. *Hoffman, A.*, M.D. Walla, S. Taghavi, D. van der Lelie, and **L. Newman**. Central New York Biotechnology Symposium, Syracuse, NY. 3 June 2011.
- Nanomaterial Contamination of Agricultural Crop Species. White, J.C., B. Xing, **L.A. Newman**, X. Ma, and S.K. Sinha. Gordon Conference on Environmental Nanotechnology, Waterville Valley, NH. 29 May – 1 June 2011.

D. Public Service Presentations (lectures, seminars, etc. to and for the public; give group or occasion, date(s), and Attendance)

- Environmental Phytotechnologies. Richard Stockton College Biotechnology Seminar Series, Pomona, NJ, 16 November 2012 (~50)
- Phytotechnology for addressing environmental problems, a two-day presentation as part of Contaminacion Ambiential y Biorremediacion at the Instituto de Ecologia, Presented as a video lecture, **Xalapa, Veracruz, Mexico**, 22-23 August 2011 (~25)

V. PUBLIC SERVICE

A. Funded Service (include consulting activities)

1. Government Agencies (Federal, State, Local):

None at this time

2. Industrial and Commercial Groups, etc.

None at this time

B. Unfunded Service to Governmental Agencies, Public Interest Groups, etc.

Was judge for 11th ESF Environmental Challenge Science Fair, 14 March 2012

VI. PROFESSIONAL DEVELOPMENT

A. Professional Honors and Awards (for teaching, research, outreach, etc.)

Professional Service Award for Exceptional Service to the International Phytotechnology Society

B. 1. Activities in Professional Organizations (offices held, service as chairman, member, participant or consultant)

Association of Environmental Health Sciences – Scientific Advisory Board, organizer for Phytoremediation session at Annual Conference in Amherst, MA
International Phytotechnology Society – President and then Immediate Past President; Chair of Gordon Award Committee, Chair of Educational Award Committee, Member of Organizing Committee for Annual Conference

2. Professional Society Membership

Association of Environmental Health Sciences
International Phytotechnology Society
Northeast Phytoremediation Society

3. Other Professional Activities

a. Editorial activity

Journal (s)	Responsibility
International Journal of Phytoremediation	co-Editor-in-Chief

Other (books, symposia, etc.)

Chair: Organizing committee for CNY Biotechnology Conference
Organizing committee for International Phytotechnology Society Conference

b. Reviewer

Journal(s)	No. of manuscripts
Chemosphere	1
Ecological Engineering	2
Environmental Science and Technology	4
Science of the Total Environment	3
PLoS I	2
Water Research	1
Atmosphere Engineering	1
Journal of Agriculture and Food Chemistry	1
Journal of Environmental Quality	1
International Journal of Phytoremediation*	78

*4 as direct reviewer, 74 as E-in-C

Agency	No. of proposals
National Science Foundation	1
National Institute of Health	1
Other	
ESF Seed Grant Program	3
ESF McIntire Stennis Program	3

c. Participation (workshops, symposia, etc.)

Name of workshop, etc.	Date	Place

Please see IV C and D above

C. Further Education/Re-training Undertaken, Leaves, Workshops, etc.

None at this time

D. Foreign Travel (Where, When, Purpose)

None at this time

VII. ADMINISTRATIVE AND SERVICE RESPONSIBILITIES (include committee participation)

A. Department-level

- I have served on the Course and Curriculum Assessment Committee since joining ESF in August 2010. In this capacity, I have reviewed new course proposals as well as participated in discussions regarding the creation of the new course series on biodiversity.
- I am participating in teaching a learning unit of the new biodiversity course
- I took a leading role in putting together a Biotechnology Minor.
- I took a leading role in developing a new course, BTC 298, which would serve as an introduction to research for those students wishing to participate in active research projects, but who do not currently have the background to enable them to do so.
- I serve as Core Team Member for the design and planning of the Academic Research Building. In this capacity, I have attended meetings on laboratory design, landscaping, and building safety.
- With my research involving plants and greenhouse needs, I have participated in design review for greenhouse renovation. I was involved in helping to outline greenhouse space needs and design that would stay within cost while increasing space for research.
- I have met with students and faculty at the receptions held for new freshman and transfer students to explain the program in EFB and more specifically the requirements and opportunities of the Biotech major.
- I have participated in the group academic advising of the new transfer students starting at ESF
- I have participated in the updating of the Natural History and Interpretation major in EFB

B. College-level

- I currently serve on the ESF Committee on Research
- I have participated in developing the new Environmental Health major at ESF

C. University-wide, including Research Foundation

- I participate in the Biotechnology Research Center planning meetings
- I am a member of the SUNY Catalyst Committee for Research
- I am a member of three Hill Collaboration Committees
    - Nervous System
    - Cancer
    - Post-Traumatic Stress Disorders

VIII. SUMMARY OF SIGNIFICANT ACTIVITIES AND ACCOMPLISHMENTS DURING THIS REPORTING PERIOD, ESPECIALLY THOSE MOST NOTEWORTHY AND RELATIVE TO THE COLLEGE'S AND DEPARTMENT'S MISSION.

Having been in the department only one year at the start of this reporting period, I still spend a significant amount of time/resources setting up the laboratory and recruiting new students. I brought one graduate student and one undergraduate student with me. Since then, I have recruited an additional 3 graduate students, with two more starting in the fall. I currently have 11 undergraduate students (two others graduated in May 2012). The students have been instrumental in the set up of the lab, including a new gel documentation system and real-time PCR. In addition to the students working in my lab, I am the academic mentor for 15 addition students. The two students in my lab who were having academic difficulties continue to improve.

As an additional learning experience for the students, both within my lab and the department, I have continued a 'Question of the Day' competition, where students compete for points by answer questions about science, current events, ecology, natural history, and ESF history. Students with the highest points at the end of the month win $25 dollar gift certificates.

I have increased the credits for the BTC401/EFB601 course that I teach in the fall to be able to have more lecture time to include the latest technologies in molecular biology in a more comprehensive manner. I have led the effort to develop a Biotechnology minor for the program, as well as proposing and helping to define the EFB/BTC 298 courses that would allow students with limited research experience to learn about research without the higher expectations of a 498 course.

In the spring, I taught a Phytoremediation course for both graduates and undergraduates. For the course, I brought in three speakers from Alcoa Corporation, BP Corporation and Brookhaven National Laboratory. The speaker sessions were open to the public, and attracted people from, O'Brien and Gere, Syracuse University, several local environmental groups as well as faculty from multiple departments. This was accomplished at a cost of $1072. As a result of the visit by the Alcoa speaker, Dr. Neil Murphy is in communication with the speaker and others at Alcoa to try to develop a collaborative relationship and research with between ESF and Alcoa

I have continued to work on plans for developing a new Phytotechnology program that would both educate and train students to do research and do work in the any of the areas that utilize plants to address environmental problems.

I have been in discussions with Dr. Greg Boyer to put together a team of researchers that would enable ESF to apply for an National Institute for Environmental Health Sciece, Superfund Research Program center grant. These grants generally fund 3-7 research programs, as well as support graduate students, do community outreach and tech transfer, with an annual budget of $1.5-2M. Last summer, Dr. Boyer and I attended the NIEHS SRP annual meeting, and conversations continue as a result of that trip. Dr. William Suk, director of the program, has agreed to visit ESF in the fall to outline what ESF would need to do to be competitive for this grant program.

I have been actively involved in the design meetings for the Academic Research building, including attending meetings with outside consultants and the University Board, as well as attending meetings on laboratory and building design, landscaping and building environment and safety.

Not exactly raise-worthy, but I again contributed a hand-made afghan to assist in the Colleges United Way fund raising efforts.

I have continued to be active in the International Phytotechnology Society (President and then Immediate Past President when my term expired and Chair of two committees, as well as member of the conference committee), the Northeast Phytotechnology Society (Founder) and the Association of Environmental Health Science (Scientific

Advisory Board Member and Session Organizer for annual conference). I am also continuing as co-Editor-in-Chief for the International Journal of Phytoremediation. And I am continuing to attend and be invited to present at several national and international conferences, and to bring as many students as possible to the meetings with me.

I have two reviewed papers published, and one book chapter published and one peer reviewed paper in press.

I continue as co-PI on a five year USDA grant ($1.49M), and PI on a contract from NASA ($73K) and an NSF grant ($278K). I have submitted one new grant as PI ($363K), and three grants as Co-PI ($333K, $587K and $588K). The grant on which I am PI has a co-PI from within the department, and the three of which I am co-PI are collaborations with faculty in ERE (1) and Chemistry (2).

I have taken students to 2 meetings this year, 5 to the Eight International Phytotechnology Conference, Portland, OR and 6 to the 2012 Biotechnology Symposium, Syracuse, NY.

With Thomas Amidon, I was a co-Chair of the Organizing Committee for the 2012 Biotechnology Symposium, which brought in speakers from around the country to present on the latest developments in Biotechnology and Entrepreneurship.

I did a graduate student recruiting booth at Brookhaven National Laboratory in August 2011, and brought Dr. Neil Murphy to BNL as the plenary speaker for the closing ceremony for the Summer Undergraduate Laboratory Internship program. His meeting with the BNL administration team has resulted in the development of a Memorandum of Understanding between SUNY, the Research Foundation, and BNL, which will be officially signed this August at BNL. I am organizing the signing event and coordinating the travel and visit by several SUNY and Research Foundation personnel, including Chancellor Zimpher, who will be this year’s plenary speaker.

I have been working with administration from Dowling College to develop an agreement between Dowling College and ESF to facilitate the acceptance of high-quality environmental students into the ESF Ph.D. program from Dowling. One of the students who will be joining my lab this fall is a result of these discussions.

I have been working with the ESF Development Office and administration from Roux Associates to develop a scholarship program that would support Ph.D. students wishing to work on applied biological remediation systems. The program would offer summer student support and funding for the calendar year research efforts.

I have sponsored a new adjunct professor, Dr. Guy Lanza, formerly of the University of Massachusetts, to develop increased international relationships and programs for ESF. We are currently working with universities in Armenia to develop a conservation program and Mahidol University in Thailand to develop an exchange program. I am also working to arrange for two international Ph.D. students to spend an academic year in my laboratory, one from Tarbiat Modares University (TMU), Iran, and the other from King Mongkut's University of Technology Thonburi, Bangkok, Thailand.

I have started discussions with both faculty from the Landscape Architect program and the Veterans Administration hospital to develop a Horticultural Therapy program at ESF, that would include these entities, as well as Upstate Medical University and Syracuse University. We are hoping to develop a certificate program within ESF, as well as establish a research program to use Horticultural Therapy as a tool to help with PSTD victims.

IX. A. FUTURE PLANS, AMBITIONS, AND POTENTIAL CONTRIBUTIONS FOR YOUR OWN PROFESSIONAL DEVELOPMENT AND THE ENHANCEMENT OF THE PROGRAM IN ENVIRONMENTAL AND FOREST BIOLOGY (brief summary)

B. PROJECTED ACTIVITIES FOR NEXT YEAR

1. Summer 2011

a. Course(s) to be offered – dependent on enrollment

EFB 530 Plant Physiology

Guest lecture on Phytoremediation at the Institute de Ecologia in Xalapa, Mexico.

b. Proposed research activity

Research activities include the continuation of research projects already underway by graduate and undergraduate students in the laboratory. These include the verification and development of a hyperspectral imaging system to determine exposure of plants to the groundwater contaminant trichloroethylene. Previous work has shown that this will be possible, but we now need to refine and confirm the initial findings. This included traveling to a Superfund site with a phytoremediation project to field test the monitoring system and then conduct the analytical analysis of plant material in the lab and the analysis of the spectral measurements taken in the field. It will also include extensive controlled testing of several species of plants under controlled conditions in the greenhouse.

We are also continuing research into the beneficial effects of plant endophyte interactions. This includes working with a colleague, George Newcomb, at the University of Idaho into the ability of select endophytes to confer resistance to various fungal pathogens. We are also looking at how, on a genetic level, the endophytes increase growth and productivity in crop plants and biofuel plants.

With Dr. William Powell, we are continuing to look at the impact of the endophytic microbes on enhanced rooting in American chestnut.

We are also continuing to look at genes that we believe are involved in the degradation pathways for chlorinated solvents, including TCE. We currently have several genetically engineering lines in the laboratory where Arabidopsis genes encoding several different P450 Enzymes have been placed under the control of a strong constitutive promoter and inserted into *Nicotiana xanthi* lines. These will be studied to correlate changes in TCE metabolism with gene expression levels. We submitted an NSF grant in February for this project.

We are continuing to look at the impact of safeners, supposedly inert compounds in pesticide formulations, on toxicity resistance and metal uptake in plants. We are looking at how the safeners up regulate gene expression for stress response elements, and how this might decrease toxicity to heavy metals in plants, and thus allow for increased metal accumulation before plant senescence.

We are also continuing our studies on plant nanoparticle interactions. These studies include, but are not limited to:

The changes in gene expression following nanoparticle exposure

The impact of decreasing concentrations on gene expression variations

The time course of gene expression changes
The impact of different soil types on bioavailability
How size and shape impact uptake and translocation
The metabolic changes in plants following nanoparticle exposure
With Dr. Cathy Murphy of University of Illinois, the impact of soil exposure on nanoparticle chemistry
The impact of nanoparticles as part of pesticide formulations on the phyllosphere bacteria, and plant uptake via spray applications. We plan to submit and NSF grant in February for this project.
With Dr. Ryan Tappero at Brookhaven National Laboratory, the three-dimensional tomographic imaging of plants at the synchrotron light source

With Dr. Vishal Shah at Dowling College, the impact on nanoparticles on commensalistic skin microbes

c. University, professional society, and public service

Continuing to serve as Immediate Past President of the International Phytotechnology Society
Continuing to work on the planning of the IPS annual meeting in Hasselt, Belgium.
Continuing to serve as the co-Editor-in-Chief for the International Journal of Phytoremediation
Working to develop a concentration in Phytotechnologies at ESF, with both undergraduate and graduate programs
Working to develop a concentration in Horticultural Therapy at ESF and the VA, with a certificate and research program
Continuing to serve on the Core Team for designing the new Academic Research Building
Continuing to serve on both the departmental CCAC and the University Committee on Research
Continuing work with Dr. Guy Lanza to develop collaborative research programs between ESF and universities in Armenia, Siberia, Lebanon, Thailand and Hong Kong.
Continuing to work with Drs. Greg Boyer and John Hasset on exploring the potential for ESF to apply to the National Institute of Health to host a Superfund Research Center.
Become more active with local groups, including Syracuse Grows, the LIPA Park Committee, and the local branch of the Sierra Club
Make more contacts with local environmental firms, as well as the central New York regulators, both federal and state to learn more about the regional environmental issues
Continue to attend and participate in the open houses and receptions for new incoming freshman and transfer students
Continue to work to develop programs with Roux Associates and Alcoa Corporation
Coordinate the MOU signing between SUNY, the Research Foundation, and Brookhaven National Laboratory

2. Fall Semester 2011

a. Course(s) to be offered

BTC 401 Molecular Techniques
EFB 601 Molecular Techniques
EFB 899 Masters Thesis Research
EFB 999 Doctoral Thesis Research
EFB 495 Undergrad Exp/ College Teaching
BTC 498 Research Problems in Biotechnology
EFB 498 Research Problems in Envin. For. Bio

BTC 420 Internship in Biotechnology

Still working to develop, with Dr. Elizabeth Folta, a mini course, to meet a Gen Ed requirement, on photography for natural science and science reporting

b. Proposed research activity

As above

c. University, Professional society, and public service

As above, with the following modifications:
Will attend the 2012 IPS meeting in Belgium
Will attend the 107th Congress of the Italian Botanical Society in Benevento, Italy as an invited speaker
Will attend the SOILREM 2012 Conference in Yantai, China as an invited speaker and member of the international organizing committee
Will attend the 1st International Conference on Contaminated Land, Ecological Assessment and Remediation in Hangzhou China as an invited speaker and member of the international organizing committee
Will attend the 28th Annual Conference on Soils, Sediments, Water and Energy in Amherst, MA. I currently plan to take 13 students with me to the conference
Will work on the planning committee for the 2013 meeting
Will start work the ESF Outreach office to start planning the 2013 meeting, to be held here in the new Gateway Building
Will with Dr. Greg Boyer to organize a visit from the NIEHS SRP administration to get more information about a proposal submission.

3. Spring Semester 2012

a. Course(s) to be offered

EFB 325	Cell Biology
BTC 499	Senior Synthesis
EFB496/796	Phytoremediation
EFB 899	Master Thesis Research
EFB 999	Doctoral Thesis Research
EFB 495	Undergrad Exp/ College Teaching
BTC 498	Research Problems in Biotechnology
EFB 498	Research Problems in Environmental For. Bio.
BTC 420	Internship in Biotechnology

b. Proposed research activity

As above

c. University, professional society, and public service

As above