

ANNUAL REPORT: June 1, 2010 – May 31, 2011
(i.e., Summer 2010, AY 2010-2011)
DEPARTMENT OF ENVIRONMENTAL AND FOREST BIOLOGY
SUNY-ESF

NAME: Lee A Newman

I. INSTRUCTIONAL ACTIVITIES

1. Regular Course Offerings

	<u>Course No.</u>	<u>Title</u>	<u>Credit Hrs.</u>	<u>No. Students</u>	<u>No. of Lab. Sections</u>
SUMMER:					
FALL:	BTC 401	Molecular Techniques	3	14	2
	EFB 601	Molecular Techniques	3	6	1
SPRING:	EFB 325	Cell Biology	3	101	0
	BTC 499	Senior Synthesis	1	11	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)

	<u>Course No.</u>	<u>Title</u>	<u>No. Students</u>
FALL:	BTC 999	Doctoral Thesis Research	1
	EFB 495	Undergrad Exp/ College Teaching	1
	BTC 498	Research Problems in Biotechnology	2
SPRING:	BTC 999	Doctoral Thesis Research	1
	EFB 495	Undergrad Exp/ College Teaching	1
	BTC 498	Research Problems in Biotechnology	5
	EFB 498	Research Problems in Environ. For. Bio	1
	EFB 496/796	Phytoremediation	12

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

None at this time

4. Guest Lecture Activities

	<u>Course No.</u>	<u>Title</u>	<u>No. of Lectures</u>
FALL:	BTC 132	Orientation Seminar	1
	LSA433/633	Planting Design and Practice	1
	ERE 796	Phytoremediation	1
SPRING	FOS 535	Advanced Forest Soils	1
	EFB 296	Human Sexuality	1

II. STUDENT ADVISING

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

I currently have 19 undergraduate students for which I serve as academic advisor.

Over the course of the past two semesters I have had 9 undergraduate students (8 of whom I am academic advisors to) who are conducting research in my laboratory:

Beverly Agtuca	Anna Karczewski
Joseph Whitaker	Melody Papapietro
Michael Cook	Funmi Agelumo
Jonathon Cooke	Arashdeep Dhillon
Robert Hamilton	

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

<u>Name</u>	<u>Degree</u>	<u>Start Date</u>
Adam Hoffman	Ph.D	8/2010

Wenjun Cai MS 6/2011

Ms Cai was officially accepted as a graduate student for the Spring 2011 semester, but due to a delay in funding, was not able to formally start at ESF until June 2011. However, she has been volunteering in my laboratory since January to start learning the skills necessary for her research, and since funding has arrived, has started the preparations for her own research. She has also attended three courses at ESF, even though she is not able to get credit for her work.

CO-MAJOR PROFESSOR

None at this time

MEMBER, STEERING COMMITTEE (other than those listed above)

None at this time

CHAIRMAN OR READER ON THESIS EXAMS, ETC.

Allison Oaks
Timothy Chaffee
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-logged; title - % time spent)

Safeners and metal toxicity protection	4
Endophytes	4
P450 genes	4
We plant to submit and NSF grant in August for this project.	
Impact of nanoparticles phyllosphere organisms	4
We plant to submit and NSF grant in August for this project.	
Impact of nanoparticles on epidermal symbiotes	2

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	Total Amount	Sub Amount	Current Year Amount	Award Period	Role	Students
USDA	Nanoparticle contamination of agricultural crop species	\$1,498,080	\$381,026	\$76,015	Mar 11-Mar 16	PI	Wenjun Cai
NASA	Development of Hyperspectral Imaging of Plants to Detect Contamination	\$182,829		\$73,183	Mar 11-Mar12	PI	Adam Hoffman
NSF	Plant Uptake and Interaction with Nanoparticles	\$277,907		\$74,878	Sept 08– Sept 11	PI	None at this time
Perkin Elmer	Equipment Grant for Research – HPLC/MS/TOF	\$68,200		\$68,200	May 11- July 11	PI	

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

None at this time

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

Agency	Title	Role	Amount
DOE	Biomass for local, clean, sustainable biofuels: production and education	PI	\$2,106,907
USDA	Use of Endophytic Bacteria and Mycorrhizal Fungi to Increase Biomass Productivity and Carbon Sequestration	PI	\$599,585
DOE	Fermentable sugars and chemicals from willow biomass and conversion to energy and value-added products	Co-PI	Preproposal
Mcintire-Stennis	Understanding the Role of Select Endophytic Bacteria in Enhanced Growth and Disease Resistance	PI	\$82,687

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. Koenig, L. Newman, S. Taghavi and D. van der Lelie. 2011. Inoculation of hybrid poplar with the endophytic bacterium *Enterobacter* sp. 638 increases biomass but does not impact leaf level physiology. *Global Change Biology Bioenergy*. Submitted.
2. Lin, W-C, G-p. Chang-Chien, **L. Newman**, C-M Kao, and J-K. Liu. 2011. Degradation of dioxin-like compounds by *Pseudomonas mendocina* strain NSYSU. *Environmental Science and Technology*. Submitted.
3. Sabo-Attwood, T., J.M. Unrine, J.W. Stone, C.J. Murphy, S. Ghoshroy, D. Blom, P.M. Bertsch, and **L.A. Newman**. 2011. Uptake, distribution, of gold nanoparticles in tobacco (*Nicotiana xanthi*) seedlings. *Nanotoxicology*. In Press.
4. Weyens, N., S. Truyens, J. Dupae, **L. Newman**, S. Taghavi, D. van der Lelie, R. Carleer, J. Vangronsveld. 2010. Potential of the TCE-degrading endophyte *Pseudomonas putida* W619-TCE to improve plant growth and reduce TCE phytotoxicity and evapotranspiration in poplar cuttings. *Environmental Pollution*, 158: 2915-2919.
5. Taghavi, S., D. van der Lelie, A. Hoffman, Y-B. Zhang, M. D. Walla, J. Vangronsveld, **L. Newman** and S. Monchy. 2010. The complete genome sequence of the plant growth promoting endophytic bacterium *Enterobacter* sp. 638. *PLoS Genetics* 6(5): e1000943. doi:10.1371/journal.pgen.1000943.

B. Non-refereed Publications

1. White, J.C. and L.A. Newman. Phytoremediation of soil contaminated with organic pollutants. In: *IUPAC Series on Biophysico-Chemical Processes in Environmental Systems; Biophysico-Chemical Processes of Anthropogenic Organic Compounds in Environmental Systems*, B. Xing, N. Senesi, and P.M. Huang, Eds. Springer. vol 3, 2011.

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

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

- Phytoremediation and Bioavailability. Croucher Advanced Study Institute, Remediation of Contaminated Land-Bioavailability and Health Risk, **Hong Kong**, 9-13 December 2010
- *Environmental bioavailability; where do we go from here?* Croucher Advanced Study Institute, Remediation of Contaminated Land-Bioavailability and Health Risk, **Hong Kong**, 9-13 December 2010
- Phytoremediation and Public Health – Implications of community involvement. Seventh International Phytotechnology Conference, **Parma, Italy**, 27-29 September 2010.
- Plant Nanoparticle Interactions. Seventh International Phytotechnology Conference, **Parma, Italy**, 27-29 September 2010.

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 2010

Talks by colleagues or students – *italics* indicates student

- Growth and Developmental Enhancement of Poplar (*Populus deltoides* x *nigra* OP367) by Associated Endophytic Bacteria. *Hoffman, A.* and **L.A. Newman**. 2010. 26th Annual International Conference on Soils, Sediments, Water and Energy, Amherst, MA 18-21 October 2010.
- Endophytic Bacteria in *Nicotiana xanthi* Daughter Plants for Increased Biomass Productivity. *Carlile, C., D.* van der Lelie, S, Taghavi, and **L. Newman**. Brookhaven National Laboratory 2010 Summer Internship Program Symposium and Poster Session. 11-12 August 2010.

Posters by colleagues or students – *italics* indicates student

- 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.
- Endophytic Bacteria Enhances Growth on Poplar Cuttings in a Dose Dependent Manner. *Agtuca, B. M.* Vaccariello, S. Taghavi, D. van der Lelie D. PhD, and **L. Newman**. Brookhaven National Laboratory 2010 Summer Internship Program Symposium and Poster Session. 11-12 August 2010.
- Endophytic Bacteria in *Nicotiana xanthi* Daughter Plants for Increased Biomass Productivity. *Carlile, C., D.* van der Lelie, S, Taghavi, and **L. Newman**. Brookhaven National Laboratory 2010 Summer Internship Program Symposium and Poster Session. 11-12 August 2010
- Bioaugmentation of *Salix spp.* Biomass Using Endophytic Bacteria for Biofuel Production. *Rosales-Zelaya, C.* D. van der Lelie, S. Taghavi, and **L. Newman**. Brookhaven National Laboratory 2010 Summer Internship Program Symposium and Poster Session. 11-12 August 2010
- Endophytic Bacteria to Promote Food Crop Growth and Yield in Tomato and Pepper Plants. *Collins, D., D.* van der Lelie, S. Taghavi, and **L. Newman**. Brookhaven National Laboratory 2010 Summer Internship Program Symposium and Poster Session. 11-12 August 2010
- Studying the Effects of *Enterobacter* sp. 638 and *Pseudomonas putida* W619 on the Growth Rate of Duckweed. *Bhatt N., S.* Taghavi, D. van der Lelie, **L. Newman**. Brookhaven National Laboratory 2010 Summer Internship Program Symposium and Poster Session. 11-12 August 2010

- D. Public Service Presentations (lectures, seminars, etc. to and for the public; give group or occasion, date(s), and Attendance)
- Using plants to solve environmental problems. O'Brien and Gere. Syracuse, NY 5 May 2011 (~20 attendees)
 - Using plants to solve environmental problems. Rutgers University Biotechnology Seminar Series, New Brunswick, NJ, 28 October 2011 (~40)
 - So where do we go from here? Bioenergy research at BNL, Brookhaven National Laboratory Minority High School Apprenticeship Program, 4 August 2010 (~35)
 - So where do we go from here? Bioenergy research at BNL, Brookhaven National Laboratory Community Summer Science Program, 20 July 2010 (~30)
 - So where do we go from here? Bioenergy research at BNL, Brookhaven National Laboratory Summer Sundays, 11 July 2010 (3 talks on same day, ~25 per talk)
 - Using plants to solve environmental problems, Brookhaven National Laboratory Brown Bag Lunch Seminar 9 July 2010 (~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.

Reviewed the National Institute of Environmental Health Sciences (NIEHS) (a research institute of the National Institutes of Health (NIH) within the Department of Health and Human Services (DHHS)) draft National Institute of Environmental Health Sciences Superfund Hazardous Substance Research and Training Program (SRP) Strategic Plan.

Was judge for 10th ESF Environmental Challenge Science Fair, 17 March 2011

VI. PROFESSIONAL DEVELOPMENT

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

None at this time

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; 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

<u>Journal (s)</u>	<u>Responsibility</u>
International Journal of Phytoremediation	co-Editor-in-Chief

Other (books, symposia, etc.)

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

b. Reviewer

<u>Journal(s)</u>	<u>No. of manuscripts</u>
Chemosphere	2
Ecological Engineering	1
Environmental Science and Technology	3
Water, Air and Soil	1
New Phytologist	1
Science of the Total Environment	4
Botanical Review	2
International Journal of Phytoremediation*	82

*3 as direct reviewer, 79 as E-in-C

<u>Agency</u>	<u>No. of proposals</u>
National Science Foundation	2
National Institute of Environmental Health Science	1

<u>Other</u>	
ESF Seed Grant Program	1

c. Participation (workshops, symposia, etc.)

<u>Name of workshop, etc.</u>	<u>Date</u>	<u>Place</u>
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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)

Please see IV C and D above

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 have also agreed to participate in teaching a learning unit of the new biodiversity course

With Dr. William Powell on sabbatical, I have served as Acting Coordinator for Biotechnology Major, which includes advising students and signing off on paperwork for students in the program.

In that capacity, I have also discussed with the faculty of the program about putting together a Biotechnology Minor, as well as putting forward 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.

With Dr. Powell on sabbatical, I have also served 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 participated in two open house receptions for new students, in the fall and in the spring. With undergraduate and graduate students working in my laboratory, we have set up table displays and met with parents and students who are interested in the biotechnology program at EFB.

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

B. College-level

Agreed to serve on the college Research Committee

C. University-wide, including Research Foundation

Participate in the Biotechnology Research Center planning meetings

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.

As a new faculty member in the department, a significant amount of time/resources were devoted to setting up the laboratory and recruiting new students. I brought one graduate student and one undergraduate student with me. Since August, I have recruited an additional graduate student (who has been working in my lab since January as she was not able to officially start until June due to delays in funding) and eight additional undergraduate students. The students have been instrumental in the set up of the lab, including a new ion chromatograph, gas chromatograph, gas chromatograph with purge and trap linkage and an electroporation system. In addition to the students working in my lab, I am the academic mentor for 10 additional students. Two of the students in my lab were struggling academically, and since joining the lab and having more direct mentoring have raised their semester GPA to above 3.0.

As an additional learning experience for the students, both within my lab and the department, I have started a 'Question of the Day' competition, where students compete for points by answering 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 been leading 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 four speakers from University of Washington, EPA, Connecticut Agricultural Research Center and Brookhaven National Laboratory. The speaker sessions were open to the public, and attracted people from the city of Syracuse, O'Brien and Gere, Cornell, several local environmental groups as well as faculty from multiple departments. Additionally, the course was linked to a phytoremediation course at Missouri Science and Technology in Rolla MO. Speaker talks were video linked to their campus, and students were able to interact and ask questions of the speakers. This was accomplished at a cost of \$2800, with \$2000 of support from the department.

I have been working with Doug Daley, and discussing with Tim Tolland, plans for developing a new Phytotechnology program that would both educate and train students to do research and do work in any of the areas that utilize plants to address environmental problems.

I have been in discussions with Dr. Bongarten to put together a team of researchers that would enable ESF to apply for an NIEHS 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. I have been in contact with Dr. William Suk, director of the program, and he has agreed to visit ESF in the fall to outline what ESF would need to do to be competitive for this grant program.

During Dr. William Powell's sabbatical, I have covered many of his duties for the management of the Biotech program, including meeting with students and advising them as needed, as well as others outlined above.

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 also contributed hand-made afghan and scarf to assist in the Colleges United Way fund raising efforts.

I have continued to be active in the International Phytotechnology Society (President 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 and one book chapter published, one peer reviewed paper in press and two submitted. I was co-PI on a five year USDA grant (\$1.49M), and PI on a contract from NASA (\$73K) and an equipment grant from Perkin Elmer (\$68K). I also transferred in an NSF grant on which I am PI (\$278K).

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
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 will include traveling to Superfund sites with phytoremediation projects 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.

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 plan to submit an NSF grant in August for this project.

We are continuing to look at the impact of 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 August for this project.

With Dr. Ryan Tappero at Brookhaven National Laboratory, the three-dimensional tomographic imaging of plants at the synchrotron light source

c. University, professional society, and public service

Continuing to serve as President of the International Phytotechnology Society until the Fall elections, after which I will have reached the term limits for holding that office

Continuing to work on the planning of the IPS annual meeting in Portland, OR.

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

Submit to the CCAC proposals for the new BTC 298 course, as well as the Biotechnology minor

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 Research Committee

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

2. Fall Semester 2011

a. Course(s) to be offered

BTC 401 Molecular Techniques

EFB 601 Molecular Techniques

Both courses have been expanded from three to four credits, with an additional hour of lecture per week

BTC 999 Doctoral Thesis Research

EFB 495 Undergrad Exp/ College Teaching

BTC 498 Research Problems in Biotechnology

EFB 498 Research Problems in Environ. For. Bio

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

b. Proposed research activity

As above with the following addition

Look at the impact of silver nanoparticle impact on the normal epidermal microorganism, including exposure from sources such as wound bandages and impregnated clothing, and the potential for mutations following exposure

c. University, Professional society, and public service

As above, with the following modifications:

After elections, will serve the IPS as Immediate Past President for two years

Will attend the 2011 IPS meeting

Will work on the planning committee for the 2012 meeting

Will start work the ESF Outreach office to start planning the 2013 meeting, to be held here in the new Gateway Building

Will attend the NIEHS SRP annual meeting to introduce Drs. Boyer and/or Hasset to the Director of the program

Will work with faculty here to plan a meeting with the Director of the SRP to discuss the process of planning for an application to the program

3. Spring Semester 2012

a. Course(s) to be offered

EFB 325 Cell Biology

BTC 499 Senior Synthesis

EFB496/796 Phytoremediation

BTC 999 Doctoral Thesis Research

EFB 495 Undergrad Exp/ College Teaching

BTC 498 Research Problems in Biotechnology

EFB 498 Research Problems in Environmental For. Bio.

b. Proposed research activity

As above

c. University, professional society, and public service

As above