

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

**NAME:** James P. Nakas

**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:	EFB 303	Microbiology	4	59	2
	EFB 301	Latin for Scientists	1	56	--

**SPRING: Medical Leave (Surgery)—No Courses Taught During the Spring Semester**

**NOTE: PLEASE INDICATE WHICH COURSE(S) HAD A SERVICE-LEARNING COMPONENT AND BRIEFLY EXPLAIN THE NATURE OF THIS COMPONENT.** For examples of service-learning in courses, see: <http://www.esf.edu/students/service/courses.htm>. Service-learning is a form of structured experiential education in which students engage with the community to be active learners, to enrich their sense of civic responsibility, and to explore practical application for course content. Faculty oversight, reflective thinking, and reciprocity are key components of service-learning. EFB courses currently listed with service-learning components include: 416/6/1, 486, 518, 521, 532, 446/646.

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

<u>a.) Fall 2010</u>	<u>Course No./Title</u>	<u>Credit Hrs.</u>	<u>No. Students</u>
	BTC 420 Intern. In Biotechnol.	3	1
	BTC 498 Res. Prob. Biotechnol.	9	3
	EFB 498 Res. Prob EFB	3	1
	EFB 899 Masters Thesis Res.	6	2
	EFB 999 Doctoral Thesis Res.	9	3

b.) Spring 2011	Course No./Title	Credit Hrs.	No. Students
BTC 498	Res. Prob. Biotechnol	6	2
EFB 498	Res. Prob. EFB	7	2
EFB 899	MS Thesis Res.	1	1
EFB 999	PhD Thesis Res.	16	4

3. Continuing Education and Extension (short courses, workshops, etc.)  
--None

4. Guest Lecture Activities

- a) Invited Seminar Speaker – Syracuse Research Corporation (SRC) – Production and Characterization of Biodegradable Polymers from Renewable Feedstocks – Attendance 50 (approx.).
- b) Invited Seminar Speaker – Rutgers University, Dept. of Biochemistry and Microbiology – Characterization of Biodegradable Polymers from Biodiesel Glycerol – Attendance 75 (Approx.).

## II. STUDENT ADVISING

A. Number of undergraduates for whom you are the student's official advisor 10 and unofficial advisor 5

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

- 1.) Mr. Christopher Addona – M.S.—Sept. 2008 – Thesis Defense Completed April 14, 2011 – Ethanol Production from Wood Hydrolysates by *Pichia stipitis*.
- 2.) Mr. Wenyang Pan –PhD – Jan. 2008 – On track for thesis defense in Dec. 2011
- 3.) Mr. Chengjun Zhu – PhD – Jan. 2007 – He will defend his thesis in Aug. 2011.
- 4.) Ms. Rosanna Stoutenburg –PhD – Aug. 2008 – On track for thesis defense Aug. 2012.
- 5.) Mr. Andrew Henwood – PhD – Part-time student – Bristol Myers Squibb Employee –Candidacy Exam Completed Summer 2010 – Currently Writing Thesis.

## CO-MAJOR PROFESSOR

### MEMBER, STEERING COMMITTEE (other than those listed above)

--Mr. Alexander Mueller, Chemistry Dept., MP Nomura

### CHAIRMAN OR READER ON THESIS EXAMS, ETC.

## **III. RESEARCH COMPLETED OR UNDERWAY**

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

Ethanol production using hemicellulosic hydrolysates of wood. Supported by other sources of funding. Time spent approximately 10%. Two students on this topic: Christopher Addona and Rosanna Stoutenburg. Mr. Addona defended his thesis on April 14, 2011. Ms. Stoutenburg will take her candidacy exam this fall (2011).

-- Mr. Christopher Addona – M.S.—Sept. 2008 – Thesis Defense Completed April 14, 2011 – Ethanol Production from Wood Hydrolysates by *Pichia stipitis*.

-- Ms. Rosanna Stoutenburg –PhD – Aug. 2008 – On track for thesis defense Aug. 2012.

-- Mr. Andrew Henwood has been a Bristol Myers Squibb research scientist for the past 20 years and has spent the past 5-8 years working part-time on his PhD on a project we designed for detecting carcinogenic compounds. He has completed the required research, passed his candidacy exam this academic year, and is currently writing his thesis.

### 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)

NYSERDA, Welch Allyn Inc., Tessa Plastics Inc., Production of Biodegradable Polymers for Manufacturing Medical Products in Central New York, \$350K, last year of 3 years, Sept. 2008 – Dec., 2011. This grant has supported two graduate students, Mr. Chengjun Zhu and Mr. Wenyang Pan, and one technician, Mr. Joseph Perrotta.

Mr. Chengjun Zhu – PhD – Jan. 2007 – He will defend his thesis in Aug. 2011.

Mr. Wenyang Pan –PhD – Jan. 2008 – On track for thesis defense in Dec. 2011

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

Biomass Research and Development Initiative – DOE/USDA. Integrated Utilization of Willow Biomass and Forest Hardwoods for Biofuel and Bioproduct Production in Northeastern Biorefineries.

Total: approx. \$7M, PIs: about 10. Due date is summer 2011. Duration: 3 years.

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

-- None

**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.) Zhu, C., C. T. Nomura, J. A. Perrotta, A. J. Stipanovic and J. P. Nakas. 2010. Production and characterization of poly-3-hydroxybutyrate from biodiesel-glycerol by *Burkholderia cepacia* ATCC 17759. *Biotechnol. Prog.* 26: 424-430.
- 2.) Stoutenberg, R.O., J.O. Perrotta, and J.P. Nakas. 2011. Overcoming inhibitors in a hemicellulosic hydrolysate: improving fermentability by feedstock detoxification and adaptation of *Pichia stipitis*. *J. Indus. Microbiol. Biotechnol.* (Accepted for Publication).
- 3.) Pan, W., J.A. Perrotta, A.J. Stipanovic, C.T. Nomura, and J.P. Nakas. 2011. Production of polyhydroxyalkanoates by *Burkholderia cepacia* ATCC 17759 using a detoxified sugar maple hemicellulosic hydrolysate. (Submitted to *Enzyme and Microbial Technology*)
- 4.) Zhu, C., C. T. Nomura, J. A. Perrotta, A. J. Stipanovic and J. P. Nakas. 2011. The effect of nucleating agents on physical properties of poly-3-hydroxybutyrate (PHB) and poly-3-hydroxybutyrate-co-3-hydroxyvalerate (PHB-co-HV) produced by *Burkholderia cepacia* ATCC 17759. (Submitted to *Polymer Degradation and Stability*)

A1. Publications (Patents)

- 1.) Nakas, J.P., C. Zhu, J.A. Perrotta, and C.T. Nomura. 2010. Methods for producing polyhydroxyalkanoates from biodiesel-glycerol. Provisional patent application submitted to US Patent and Trademark Office 11/12/2010.

B. Non-refereed Publications

-- None

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

1.) Zhu, C., C. T. Nomura, J. A. Perrotta, A. J. Stipanovic and J. P. Nakas. Production and Characterization of Poly-3-Hydroxybutyrate from Biodiesel-Derived Glycerol by *Burkholderia cepacia* ATCC 17759. Annual meeting Am. Soc. Microbiol., May 24-28, 2010 San Diego, CA.

2.) Zhu, C., C. T. Nomura, J. A. Perrotta, A. J. Stipanovic and J. P. Nakas. Production and Characterization of Poly-3-Hydroxybutyrate from Biodiesel-Derived Glycerol by *Burkholderia cepacia* ATCC 17759. Pacificchem 2010, Dec.15-20, 2010, Honolulu, HI.

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

-- None

**V. PUBLIC SERVICE**

A. Funded Service (include consulting activities)

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

--None

2. Industrial and Commercial Groups, etc.

-- member, Institutional Biosafety Committee, Bristol Myers Squibb Inc., Syracuse, New York

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

--Member, Advisory Committee, CNY Biotechnology Research Center

**VI. PROFESSIONAL DEVELOPMENT**

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

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

-- None

2. Professional Society Membership

- American Society for Microbiology
- American Academy of Microbiology

3. Other Professional Activities

- a. Editorial activity -- None

Journal (s)

Responsibility

Other (books, symposia, etc.)

- b. Reviewer -- None

Journal(s)

No. of manuscripts

Agency

No. of proposals

Other

- c. Participation (workshops, symposia, etc.)

Name of workshop, etc.

Date

Place

-- None

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

-- None

D. Foreign Travel (Where, When, Purpose)

-- None

**VII. ADMINISTRATIVE AND SERVICE RESPONSIBILITIES (include committee participation)**

A. Department-level

B. College-level

-- Chairperson, Institutional Biosafety Committee

C. University-wide, including Research Foundation

**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.** One paragraph on each of the following would be most helpful: this past year, what have you done for our students, department/college, and self professionally? NOTE: The information in this section (along with the supporting specific information elsewhere in this report) should be your strongest case for being considered for a discretionary raise, which I'll continue to award based on your contributions to the department and college this reporting period.

- 1.) Students: Although on medical leave for most of the spring semester, this academic year I continued to make room in my laboratory for undergraduate students for a total of 28 credit hours which included Internship in Biotechnology (BTC 420), Res. Prob. Biotechnology (BTC 498), and Res. Prob. EFB (EFB 498). In addition, one MS student (Mr. Christopher Addona) defended his thesis, and three PhD students (Mr. Chengjun Zhu, Mr. Andrew Henwood, and Mr. Wenyang Pan) passed their candidacy exams.
- 2.) Department/College: During this reporting period, we published two papers, one on ethanol and one on polyhydroxyalkanoates (PHAs), produced from wood hydrolysates and biodiesel glycerol, respectively. Two additional manuscripts on PHAs will be submitted, probably within 1-2 weeks. These publications will further strengthen the position of the department and the college in the area of bioconversion of renewable resources to biofuels and biomaterials, an area the college has devoted considerable effort to maintain. In addition, a provisional patent application was filed with the USP&TO and a full patent application will follow this summer as the provisional filing offers protection for one year only.
- 3.) Self: During the past year I have expended much effort in strengthening our corporate relationships with local companies with whom we have active collaborations and others with whom we would like to develop active collaborations. Having established active partnerships with Welch Allyn/Blue Highway and Tessy Plastics, we continue to work towards scaling up our laboratory processes to a pilot plant level and, ultimately, towards commercialization. Some equipment problems have impeded progress but we work to resolve these issues. Recently, we have initiated a collaboration with an upstate biodiesel company for the production of biodegradable polymers from biodiesel glycerol. The company has expressed an interest in paying for the patent application and licensing the technology after the patent is issued.

**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)**

Plans for the immediate future will include continued pursuit of accomplishments as described under **VIII** (1,2, and 3). I will continue to make my laboratory available to undergraduate students and work toward completion of the graduate programs of the graduate students for whom I am the major professor. Completion of these graduate degrees should result in the generation of additional publications on degradable polyesters produced by bacteria. We have enjoyed productive relationships with Drs. Nomura and Stipanovic and look to continue this collaboration within the Chemistry Department. Lastly, we hope to continue our collaboration with Welch Allyn/Blue Highway and Tessy Plastics for the purpose of using biodegradable polymers for the production of disposable medical products.

**B. PROJECTED ACTIVITIES FOR NEXT YEAR**

1. Summer 2009

a. Course(s) to be offered

--None

b. Proposed research activity

--as described above

c. University, professional society, and public service

--as described above

2. Fall Semester 2009

a. Course(s) to be offered

-EFB 303 (Microbiology)

-EFB 301 (Latin for Scientists)

b. Proposed research activity

--as described above

c. University, Professional society, and public service

--as described above

3. Spring Semester 2010

a. Course(s) to be offered

--EFB 505 (Microbial Ecology)

--EFB 403 (Microbiological Diseases of Fish and Wildlife)

b. Proposed research activity  
--as described above

c. University, professional society, and public service  
--as described above