Date: August 1, 2016

To: Academic Affairs

From: Frank Galey, Dean, College of Agriculture and Natural Resources

Re: Entomology Graduate Program Review

I would recommend this program be continued with additional review and study at the University of Wyoming with the following comments.

- This program has 4 faculty members; two of whom have significant extension/state service responsibilities. Despite that, the faculty have attracted significant grant funding and have been very productive in terms of publication.
- The program works closely at the PhD level mentoring students in the interdisciplinary Program in Ecology (“PIE”).
- Courses for this program consistently attract appropriate enrollments and the material is important to students in other programs. In addition, graduates of the program fill an important niche in providing the state with expertise in invasive species management.
- Given the larger picture of having slightly below minimum graduation rates in other MS programs in the department, I would recommend investigating the consolidation of all of the MS programs in the department (ESM) under an agroecology or other similar rubric. Even if this is done, it would be difficult to see significant savings given the service requirements of two of the faculty members.

Thank you and please let me know if you wish to discuss this further.
Title of Program/Specialization: MS in Entomology
Indicate whether undergraduate or graduate program/specialization: Graduate
Department and College: Ecosystem Science & Management, Agriculture & Natural Resources
Department Head Name and contact information (phone, email): Scott Miller; 766-4274; snmiller@uwyo.edu

Part 1 – Program Review

1. Program Demand*
   a. Number of graduates over 5-year period: 6 (plus 2 foreign exchange students)
   b. Enrollment in major/specialization over 5-year period: 6

2. Program Quality: Is the program of high quality?
   a. Program accreditation NA
      i. For all other programs include:
         1. Date of most recent Academic Program Review (APR): N/A
         2. List of recommendations from the most recent APR and progress to date. N/A

   b. Credentials of faculty
      i. Include a list of all faculty by name, highest degree and discipline of highest degree.

<table>
<thead>
<tr>
<th>Name</th>
<th>Rank</th>
<th>Highest Degree</th>
<th>Discipline</th>
<th>Gender</th>
<th>Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scott Shaw</td>
<td>Professor</td>
<td>PhD</td>
<td>Entomology</td>
<td>Male</td>
<td>White /Not Hispanic</td>
</tr>
<tr>
<td>Alex Latchininsky</td>
<td>Professor</td>
<td>PhD</td>
<td>Entomology</td>
<td>Male</td>
<td>White /Not Hispanic</td>
</tr>
<tr>
<td>David Legg</td>
<td>Professor</td>
<td>PhD</td>
<td>Entomology</td>
<td>Male</td>
<td>White /Not Hispanic</td>
</tr>
<tr>
<td>Tim Collier</td>
<td>Assoc. Professor</td>
<td>PhD</td>
<td>Entomology</td>
<td>Male</td>
<td>White /Not Hispanic</td>
</tr>
</tbody>
</table>
ii. Grants, both proposed and awarded to academic personnel: Previous 5 years. 3 faculty (Latchininsky, Collier, Shaw) held appointments with significant research percentages.

1. Amount applied for: $1,553,794
2. Amount received: $798,545

<table>
<thead>
<tr>
<th>Proposal Number</th>
<th>Title</th>
<th>Investigators</th>
<th>Department</th>
<th>Agency</th>
<th>Date Applied</th>
<th>Amount Applied For</th>
<th>Date Received</th>
<th>Amount Received</th>
<th>Date Range</th>
<th>Account Number</th>
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<tbody>
<tr>
<td>PN-682</td>
<td>Travel Support Funding for the Mosquito Larval Control Workshop and West Nile Virus Prevention Training Conducted by the City of Laramie and UW-ES-Entomology.</td>
<td>Schell, Scott, Alexandre Latchininsky, and Keith Wardlaw.</td>
<td>ESM</td>
<td>Wyoming Department of Agriculture.</td>
<td>03/25/2016</td>
<td>$5,200</td>
<td>05/19/2016 - 12/31/2016</td>
<td></td>
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<tr>
<td>PN-589</td>
<td>Wyoming School Integrated Pest Management Outreach and Training.</td>
<td>Latchininsky, Alexandre, and John Conn.</td>
<td>ESM</td>
<td>National Institutes of Food and Agriculture (USDA).</td>
<td>12/09/2015</td>
<td>$30,000</td>
<td>02/28/2017</td>
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<tr>
<td>PN-551</td>
<td>Cooperative Agreement between Wyoming</td>
<td>Latchininsky, Alexandre, and John Conn.</td>
<td>ESM</td>
<td>Wyoming Department of Agriculture.</td>
<td>09/15/2015</td>
<td>$97,068</td>
<td>10/01/2015 - 09/30/2016</td>
<td>1002957</td>
<td></td>
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<tr>
<td>Project Number</td>
<td>Description</td>
<td>Responsible Party</td>
<td>Date of Start</td>
<td>Amount</td>
<td>Date of End</td>
<td>Project Code</td>
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<tr>
<td>PN-351</td>
<td>Wyoming Cooperative Agriculture Pest Survey - Bundled Small Grain Commodity Pest Survey.</td>
<td>Latchininsky, Alexandre, and Larry Debrey.</td>
<td>08/12/2014</td>
<td>$26,171</td>
<td>02/01/2014</td>
<td>1002266B</td>
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<tr>
<td>PN-350</td>
<td>Wyoming Cooperative Agriculture Pest Survey - Nematode Survey.</td>
<td>Latchininsky, Alexandre, and Larry Debrey.</td>
<td>08/12/2014</td>
<td>$6,069</td>
<td>02/01/2014</td>
<td>1002266A</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>PN-239</td>
<td>Crop Protection and Pest Management Competitive Grants Program Extension</td>
<td>Schell, Scott, Alexandre Latchininsky, Brian Mealor, John Connett,</td>
<td>06/27/2014</td>
<td>$501,492</td>
<td>11/14/2014</td>
<td>1002549</td>
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<tr>
<td>Project Code</td>
<td>Title</td>
<td>Implementation Details</td>
<td>Lead Principal Investigators</td>
<td>Organization</td>
<td>Start Date</td>
<td>End Date</td>
<td>Amount</td>
<td>Funding Date</td>
<td>Notes</td>
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<tr>
<td>PN-238</td>
<td>Travel Support Funding for the Mosquito Larval Control Workshop and West Nile Virus Prevention Training for Abatement Personnel from District All Over Wyoming Being Conducted by the City of Laramie and UW-ES-Entomology Here in Laramie.</td>
<td>Schell, Scott, AlexandreLatchininsky, and Keith Wardlaw.</td>
<td>ESM</td>
<td>Wyoming Department of Agriculture</td>
<td>05/16/2014</td>
<td>08/22/2014</td>
<td>$5,200</td>
<td>06/20/2014</td>
<td>1002379</td>
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<tr>
<td>PN-229</td>
<td>Wyoming Potato Cyst Nematode Survey.</td>
<td>Latchininsky, Alexandre, and Larry Debrey.</td>
<td>ESM</td>
<td>USDA APHIS.</td>
<td>06/09/2014</td>
<td>08/12/2014</td>
<td>$3,357</td>
<td>07/01/2014</td>
<td>1002374</td>
<td></td>
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<tr>
<td>PN-228</td>
<td>Wyoming CAPS Nematode Survey, Bundled Small Grain Commodity Survey, and Infrastructure.</td>
<td>Latchininsky, Alexandre, and Larry Debrey.</td>
<td>ESM</td>
<td>USDA APHIS.</td>
<td>03/11/2014</td>
<td>03/26/2014</td>
<td>$111,298</td>
<td>02/01/2014</td>
<td>1002266</td>
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</tbody>
</table>
iii. Publications by academic personnel

2015


“Cicada Wyoming’s Summer Songsters” Western Confluence Winter 2014 Issue 01 2014.
arthropod evolution, insect biodiversity, insect paleontology, history of life, beneficial insects, insect ecology, terrestrial ecosystems


Rashford, Benjamin, Ritten, John & Latchininsky, Alexandre 2013. Assessment of comprehensive values of Western Rangelands UW Extension


2012


Gapparov, Furkat, Latchininsky, Alexandre & Govorov, Dmitri 2012. FAO UN workshop on locusts in Caucasus and Central Asia Plant Protection and Quarantine 2: 4-8

Rashford, Benjamin & Latchininsky, Alexandre 2012. Assessment of comprehensive values of Western rangelands NGMB 2012 annual meeting Proceedings (electronic publication)

Latchininsky, Alexandre 2012. FAO UN 5-year Program on locust management in Caucasus and Central Asia NGMB 2012 annual meeting Proceedings - electronic publication


Presentations by faculty, 2011-2015:

2015

Collier, T. 2011-2016. Weed Biological Control in Wyoming. Wyoming Weed and Pest Annual Fall Conference (presentations each year).

Latchininsky A.V. 2015 Biological control of grasshoppers: advances and obstacles. 11th ENTO Short Course, Laramie, WY. 19 March 2015.


Latchininsky A. 2015 Master Gardener Entomology training. Fremont County Master Gardener program.

Latchininsky A. 2015 Laramie County Master Gardener Entomology training. Cheyenne, WY.


Karen Panter, Christopher Hilgert, Scott Schell, Bill Stump, Alex Latchininsky. 2015 Plants, Pests, and Pathogens. Statewide via zoom webinar, four different one-hour sessions on current problems on horticultural plants around Wyoming; held June 25, July 30, August 26, and September 24 in between 6 and 14 counties, depending on the date.

2014


Alex Latchininsky. 2014. Fremont County Master Gardener Entomology program. Titles presented by A. Latchininsky (6): Insects in the garden: pests or pets?; Order Lepidoptera; Plant damage by arthropods; Main orders of horticultural importance; Insect ID practice; How to use Pete. Riverton, WY. April 25.


Alex Latchininsky. 2014. Locusts and us. Nukus, Uzbekistan. FAO UN Training on locust monitoring and information management, August.


2013


Latchininsky. 2013. Introduction to Entomology. 9th ENTO Short Course, UW. 19 March 2013.


A. Latchininsky. 2013. Specimen handling. Insect identification to order. 9th ENTO Short Course, UW. 20 March 2013.


A. Latchininsky. 2013. Locusts, grasshoppers and climate change. USDA-APHIS-CPHST. Phoenix, AZ.


2012


Shaw, Scott R. 2012. Into the cloud forests of Ecuador: where the wild things are. Harvard University, Museum of Comparative Zoology, October, 2012; and, Chamela Biosphere Reserve, Chamela, Mexico, November, 2012.

2011


Shaw, Scott R. 2011. Into the cloud forests of Ecuador: where the wild things are. UW Laramie campus and UW Casper College Center. Faculty Senate Speaker Series invited lecture.

iv. National/international awards
2015

Latchininsky: Best Poster Award, International Geography Union Conference, Moscow, August 2015. Title: Application of Remote Sensing to Migratory locust monitoring in the Aral Sea zone, Uzbekistan (with F. Loew)

2014


2012

Latchininsky: International Excellence in Integrated Pest Management Award for developing and delivering efficient, economic and environmentally less hazardous methods of grasshopper control on Western rangelands. Presented at 7th International IPM Symposium in Memphis, TN, March 2012.

v. Other

2015

Latchininsky received the University of Wyoming International Board of Advisors Faculty Award for Internationalization

2013

Latchininsky: Selection committee chair, Sir Boris Uvarov Award in Applied Acridology (2013)

Shaw: Nominated for UW Alumni Association Faculty Award by graduating senior Mary Centrella.

Shaw: One of my participating NSF-RET science teachers, Ms. Laurie Graves of Sheridan, was awarded the Presidential Award for Mathematics and Science Teaching, the highest honor given to U.S. teachers. I nominated Ms. Graves for the award, based on her work with our Biodiversity Project in Ecuador. She wins a $10,000 award and a 3-day trip to Washington D.C.

Shaw: 2013, Research Associate, Museum of Comparative Zoology, Harvard University.
Shaw: 2013, honorary patronym, Allorhogas scotti, named by J.J. Martinez and A. Zaldivar-Riveron, a new wasp species from Chamela Biosphere Reserve, Mexico.

Shaw: 2013, honorary patronym, Heterospilus shawi, named by Dr. P. M. Marsh, Systematic Entomology Laboratory (retired), a Costa Rican wasp.

2012

Latchininsky: Fall 2012 semester UW Faculty Senate Speaker Award; Lecture on the Aral Sea ecological catastrophe. Two presentations, one at Casper college (November 1), the other at UW campus (November 29).

2011

Shaw: Outstanding Educator Award, UW College of Agriculture and Natural Resources, awarded December 2010.

Shaw: Nominated for Ellbogen Meritorious Teaching Award, spring semester 2011.

Shaw: Faculty Senate Speaker Series invited speaker, selected May 2011 for fall semester.

Shaw: 2011, Research Associate, Museum of Comparative Zoology, Harvard University

Shaw: Awarded a collection development budget of $5,000 from the Berry Biodiversity Conservation Center to enhance the UW Insect Museum's collection, May 2011.

c. Program reputation
   i. If program is ranked, include rank and by what organization.  N/A
   ii. Include a brief description of any other indicators of program reputation such as demand (e.g. waiting lists or over enrollment) for admission into program, employer data/feedback, etc.

d. Curriculum of major or specialization
   i. Include a list of courses by prefix, number, title required in the major or specialization (do not include general education course unless required as part of the major requirements.)
ENTO 5300 - Applied Insect Ecology (3 credits)
ENTO 5678 - Aquatic Entomology (3 credits)
ENTO 5682 - Insect Anatomy/Physiology (5 credits)
ENTO 5684 - Classification of Insects (4 credits)
ENTO 5687 - Insect Evolution (3 credits)
ENTO 5884 - Insect Behavior (3 credits)

e. Distance delivery of program/major
   i. None

f. Quality of Assessment Plan/data. There are fur component to the assessment plan for the MS program in Entomology
   i. Informal review. Faculty are engaged in ongoing dialogue with the head and as a unit to ensure that adequate and
      appropriate courses are being taught and that students are receiving appropriate mentoring.
   ii. Annual student evaluation. The students are reviewed annually by their major advisor using a rubric provided by
      the department. Continuation of funding and graduate school is contingent on adequate progress.
   iii. Committee review. At the conclusion of the students’ MS, each member of the graduate committee fills in a rubric
      that evaluates the student based on a range of metrics including (a) knowledge content; (b) communication ability;
      (c) professionalism / readiness; (d) intellectual contributions
   iv. Student review. At the conclusion of the student’s program the student is asked to meet with the department head
      for an exit interview, at which point the student provides feedback regarding his/her experience, workplace
      readiness, job prospects, overall satisfaction with the UW experience, and more.

g. Strategic Plan
   i. Include a brief description of any plans for the program or specialization that appear in the college/department
     strategic plan (i.e., facilities upgrades, curriculum changes, on-line or off-campus delivery, enrichment learning
     opportunities, etc.)

h. Other:

3. Mission Centrality: Does the program advance the mission of UW including institutional strategy?
   a. Describe how the program supports the mission, vision and strategic goals of UW.
The Entomology MS program supports multiple goals from the most recent draft of the University strategic plan. After graduation, entomology MS students have taken jobs that contribute to the well-being of Wyoming citizens, particularly citizens involved in agriculture (see below). The Entomology MS program provides critical training in pest management that students need for future jobs in agriculture out in the state and beyond. During their programs, Entomology MS students conduct applied research that directly benefits Wyoming citizens involved in agriculture. Statewide engagement by Entomology faculty and graduate students with K12 educators also benefits Wyoming citizens. The Entomology MS program is an important component of two areas of distinction: STEM and Environment, Agriculture and Natural Resources.

b. Describe how the program contributes to other programs across campus (i.e., general education courses, minor or support courses, interdisciplinary program, etc.)

Graduate courses in Entomology are taken by MS and PhD students in Agronomy, Ecology and Zoology and Physiology. Graduate students in these outside disciplines often have an entomological focus to their research and require training that is provided by Entomology coursework. Students from several other departments (Zoology & Physiology, Plant Sciences, Botany, PiE) take courses in Entomology to gain a better understanding of the physiology, ecology and role of insects.

c. Include placement data for graduates and indicate if graduates are working in the field or not.

All the recent MS graduates listed below are using their entomological skills in their chosen field.
- Kathleen Meyers – employed by the U.S. Dept. of Agriculture, Agricultural Plant Health Inspection Service, Plant Protection and Quarantine, Cheyenne, WY.
- Kelsey Swanson – works at the Wisconsin Game and Fish
- Megan Wilson – now a PhD student in ecology, UW
- Travis Gilchrist - works as US Army Entomologist, rank - captain.
- Arthur Kneeland - works as lecturer in Biology at U. of Wisconsin - Stout.
- Jerod Smith - works at Colorado cattlemen trust
- * Luis Felipe Almeida – visiting student from Brazil, mentored at UW for much of 2014, completed MS in entomology
- * Blanca Andrea Rodriguez Jimenez – visiting student from Colombia (2012-2015). Completed MSc in Biological Sciences from the Universidad Nacional de Colombia, Bogota

d. Describe the uniqueness or duplication of this program across the UW.
The Entomology MS program is completely unique at the University. Faculty and students in the department take courses within other departments to fulfill science requirements for their research, but there is no duplicate effort being undertaken by other department or colleges.

e. Other: Nothing to report

4. Cost: Is the program financially viable?
   a. Ratio of student credit hours per FTE.

Faculty job descriptions:

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>Program</th>
<th>Teaching</th>
<th>Research</th>
<th>Extension</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collier</td>
<td>Tim</td>
<td>ENTO</td>
<td>18</td>
<td>52</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>Latchininsky</td>
<td>Alex</td>
<td>ENTO</td>
<td>0</td>
<td>34</td>
<td>58</td>
<td>8</td>
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<tr>
<td>Legg</td>
<td>David</td>
<td>ENTO</td>
<td>47</td>
<td>0</td>
<td>0</td>
<td>53</td>
</tr>
<tr>
<td>Shaw</td>
<td>Scott</td>
<td>ENTO</td>
<td>40</td>
<td>40</td>
<td>0</td>
<td>20</td>
</tr>
</tbody>
</table>

Full-time faculty: 4.0

Faculty FTE (instruction): 1.05
Average SCH / yr: 429.67
Ratio: SCH/FTE: (429.67 / 1.05) = 409.2

b. Direct instructional expenditures: The department allocates annual funding based on faculty teaching appointments and laboratory requirements. Prior expenses are hard to quantify prior to 2015, but for FY 2015, entomology faculty were allocated $3,391.12.
   i. Per student credit hour
      1. $3,391.12 / 469.9 = $7.22
   ii. Per total degrees awarded
      1. ($3,391 * 5) / 6 = $2,825

c. Course enrollment
   i. Number of classes falling under University minimums. **One class** failed to meet minimum requirements but was still held. In several cases dual listed 4000/5000 courses were held when the graduate section of the course was below the minimum since the combined numbers justified the course going forward.
ii. Lower-division courses falling under University minimums. None

d. Other instructional cost drivers, such as:
   i. Section fill rates
   ii. Course completion rates
   iii. Curricular complexity
   iv. Faculty course load. Faculty in the Entomology department have fulfilled their teaching expectations according to their job descriptions and over the past five years all courses that have been offered in the bulletin have been taught by entomologists. We have not spent any money on contract hires to teach classes.

e. Research expenditures per tenured/tenure-track FTE (and other academic personnel, where appropriate)

f. Compare your data to national benchmarks (Delaware data). Not available.

g. Other: The Department of Ecosystem Science and Management fully supports the Entomology MS degree program. Faculty in the program are highly regarded in their discipline and pursue excellence in education, research, and extension. The University expenses regarding this degree program are minimal, with a high return from the faulty in terms of academic engagement and research income. The Department has lost faculty members over the years without replacement, and the existing faculty have been shouldering a strong program for many years. Faculty in the program support numerous PhD students, and the MS program occasionally goes through lower enrollment numbers as faculty acquire grants and focus their attentions on PhD students, but the quality of the MS students has always remained high as evidenced by the excellent track record of placement in their chosen field and activity in entomology post-graduation.