



**Funding Recommendation and Authorization
(Internal Use Only)**

Funding Program: _____ External Mentor _____

Program Coordinator (Signature) _____ *R McColl* _____

Recommendation from Program Coordinator:

I strongly support Dr. Lavine's proposal to pursue a mentoring relationship with Dr. Carol Lee (Univ of Wisconsin). Dr. Lee is an outstanding role model in that she has achieved international renown in the field of evolutionary genetics and physiology of invasive and colonizing species. Dr. Lavine also demonstrates significant accomplishment thus far in her career as a recently tenured associate professor of entomology and is likely to make the most of this opportunity to work with a world-class scientist. As noted in the application, the purpose of the proposed collaboration is to broaden Dr. Lavine's research on the genetic basis of trait evolution in beetles to encompass evolutionary and physiological genomics; additionally, Drs. Lee and Lavine suggest that their collaboration will develop a novel branch of evolutionary biology. The proposed plan for Dr. Lavine's visit to U Wisc, and to Korea to participate in an international meeting with Dr. Lee is reasonable. Although the budget is somewhat high, the opportunities for launching Dr. Lavine's career to a new level are unique and arguably superior among applicants to this program.

Fund: ☒ X ☐ Yes ☐ No

Amount: \$5352 travel + \$750 honorarium

NSF ADVANCE Budget Authority Signature/Date: _____

Comments:

Coordinator sends to Director; Director to ADVANCE Sr. Administrative Group where funding decision is made. Return to Director. Director disseminates to Admin Assistant, Fiscal Technician and Program Coordinator. Program Coordinator communicates with applicant via Award letter which outlines timeline and deliverables (e.g., reports, program evaluation, restrictions, etc.).

ADVANCE at WSU



Coversheet

Applicant Name: Laura Corley Lavine

Position/Title: Associate Professor

Department name: Entomology Zip: 6382

Email: lavine@wsu.edu Phone: 5-7907

Funding requested from the following program:

- ☐ Transitions
- ☒ External Mentor
- ☐ Hiring Augmentation Assistance
- ☐ PRO-NET
- ☐ Dual Partnership
- ☐ Social Science Research
- ☐ Department Development

Check list for proposal:

- ☒ Coversheet/Signature page
- ☒ Proposal
- ☒ Budget

Proposal Title (if applicable): A New Synthesis of Evolution, Development & Physiology

Project Start Date: April 1, 2012

Project End Date: March 31, 2013

PI Signature/date:

Ann S. Conrath 1-23-12

Amount Requested: \$5,352

Name of Fiscal Agent: Adam C. Williams

Department Chair Signature/date:

Walter S. Sledge 1-23-2012

Dean Signature/date:

Daphne L. ... 1/25/12

Received by (ADVANCE representative)/date:

Patricia C. ... 1/25/12

A New Synthesis of Evolution, Development, & Physiology

External Mentor: Carol Eunmi Lee is a full Professor at the Center of Rapid Evolution, the Dept. of Zoology, and a faculty trainer in the Dept. of Genetics at the Univ. of Wisconsin, Madison. Professor Lee is a pioneer in the field of the evolutionary genetics and physiology of invasive and colonizing species. Her work has dissected the genetic and physiological targets of selection during major habitat transitions. Her work is internationally recognized and has been widely cited, including in three textbooks. She has collaborators in both Asia and in Europe and she is routinely invited to give symposium and plenary talks at conferences in her field. Her research has been funded by the NSF and NOAA for over 11 years (\$3.9 million directly to CEL) and she has served on review panels for NSF, NSERC, and NOAA in addition to being a reviewing and associate editor for the top journals in the field of evolutionary biology (*Evolution*, *Evolutionary Applications*, *Journal of Evolutionary Biology*).

Collaboration: Professor Lee and I have been professional colleagues for over 15 years. However, we had never formalized this relationship. Now, our research paths and interests are converging and overlapping sufficiently to have common ground for collaboration. Professor Lee's work is focused on the genetic architecture of invasive species using phenotypically plastic copepods and mussels. My own work is on the genetic basis for extreme trait evolution in phenotypically plastic beetle species. I have been very focused on the genetic and physiological mechanisms underlying trait evolution whereas in her most recent work, Professor Lee has branched into ecological and evolutionary genomics. Her work in this area is exactly the direction my research is headed. My collaboration with Professor Lee is expected to expand the direction of my research into the more evolutionary and physiological genomics realm, providing solid foundation for attracting extramural grant funding and expanding and transforming the scope of my research. In addition, we see this collaboration as a remarkable opportunity to synthesize a novel branch of evolutionary biology, on the role of physiology in 'evo-devo.' For the past 20 years, the field of 'evo-devo' has focused on morphological trait evolution, but because of recent breakthroughs in bioinformatics technology, physiological traits can now be more fully understood. This is an area both of our research programs are revealing to be critically valuable for the field in creating unexplored areas of research. In fact, we have very specific ideas about applying these ideas towards a new program at NSF called "Science Across Virtual Institutes" and using our international colleagues to build just such an institute for this novel branch of evolutionary biology.

Timeline: In April, 2012, I propose to travel to the Univ. of Wisconsin, Madison to meet with Professor Lee and begin our long-term collaborative research projects on (1) evolutionary & physiological genomics of adaptive trait evolution and (2) putting "physiology" into the study of 'evo-devo'. I will present a seminar in her departmental seminar series and this will present an opportunity for Professor Lee to assess my research program and its future directions. In August 2012, we will travel to Daegu, Korea as invited participants in the symposium "Evolution & Development of Integrated Phenotypes" at the International Congress of Entomology (August 19-24; <http://www.ice2012.org/>). We will capitalize on the international nature of this symposium and Congress to further synthesize our collaboration and to enlist members for our virtual institute. Dr. Lee is well connected in Asia and Europe and will introduce me to her colleagues.

CENTER OF RAPID EVOLUTION
DEPARTMENT OF ZOOLOGY, Birge Hall, 430 Lincoln Dr.
UNIVERSITY OF WISCONSIN - MADISON

January 25, 2012

ADVANCE Program
Washington State University

To Whom it May Concern:

I would like to express my utmost support and enthusiasm for Dr. Laura Lavine's application to the ADVANCE Program at Washington State University. I have known Dr. Lavine for over 13 years, as an academic colleague in a more advanced station in life. I first met Dr. Lavine at a conference where she won an award for the best graduate student talk. Since that time, I have kept track of her research because it was evident that Dr. Lavine would become a rising star.

Dr. Lavine's research examines how the action of developmental genes and environmental factors control body plan formation, as well as shape and size. Her research is of general importance for understanding how genes regulate the growth of extremities, such as appendages and limbs. Dr. Lavine has already demonstrated a history of productive collaboration leading to the novel syntheses of fields. For example, her collaboration with Doug Emlen at the University of Montana has led to the fusion of the study of sexual selection and behavior with that of developmental genetics. Her work with Dr. Emlen examined the development of morphological traits under sexual selection, such as the exaggerated weaponry of beetles. This integration of fields has led to several highly significant publications.

When Dr. Lavine asked me to serve as an external mentor for this program, I did not hesitate to agree. We have both recognized the neglect of physiology in the study of evolution of development (evo-devo). Yet we bring very different skill sets to attack the problem. Dr. Lavine's work has significantly contributed to our understanding of the role of physiology (e.g. insulin signaling pathway) in causing morphological differentiation during the growth and development of animals. My work has examined the role of physiological evolution in allowing the invasion of novel habitats, using genomic approaches. With Dr. Lavine's background in development and my background in physiological genomics, our collaboration would enhance communication between the scientific communities of physiology and development.

Thus, we would like to "inject physiology into evo-devo," by writing synthetic reviews, organizing integrative symposia, and fostering interaction between our labs to produce novel synthetic research. Such efforts are likely to yield transformational insights into the evolution of animal body forms and the environmental (and physiological) factors that could yield such novelty.



Dr. Carol E. Lee, Professor
Center of Rapid Evolution (CORE)
University of Wisconsin
Madison, WI 53706
carollee@wisc.edu, (608) 262-2675



Applicant Name: Laura Corley Lavine

Proposal Title: A New Synthesis of Evolution, Development & Physiology

| Program Budget Sheet | |
|--|----------------|
| Category/Description | Amount |
| <p>Funds are requested for Lavine to cover partial costs of travel and per diem to Madison, Wisconsin for five days. Funds are also requested to fund a joint trip for Lavine and Lee to participate as invited symposium speakers at the International Congress of Entomology meeting being held from Aug 19-24 in Daegu, Korea. Attending this congress together is expected to facilitate their collaboration and offer opportunities for networking for the planned proposal to the NSF Science Across Virtual Institutes program. This program brings scientists from around the world together to collaborate and cross train students who are working on similar research questions and issues.</p> <p>Travel:</p> <p>Airfare from Madison WI to Daegu, South Korea = \$1945 (Lee) \$1945 Airfare from Spokane, WA to Daegu, South Korea = \$1521 (Lavine) \$1521 <i>No Registration fees are requested.</i></p> <p>Hotel (shared by Lee & Lavine) (\$158) times 7 nights = \$1106 \$1106 <i>No per diem for Daegu is requested.</i></p> <p>Pullman to Madison = \$500 \$500 Per Diem Madison = \$56/day times 5 days = \$280 \$280 <i>No Lodging is requested.</i></p> | |
| TOTAL AMOUNT REQUESTED | \$5,352 |
| | |