NOMINATION PACKAGE
2014 Innovation in Co-Curricular Education Award

Dr. Jennifer Leavey, "Georgia Tech Urban Honey Bee Project"

Contents

Georgia Institute of Technology

School of Chemistry and Biochemistry

25 January, 2014

Members of the Selection Committee:

It is a pleasure to nominate **Dr. Jennifer Leavey** for the *2014 Innovation in Co-Curricular Education Award*. This nomination is based on her creation of the Georgia Tech Urban Honey Bees Project (GTUHBP), a multifaceted program that has attracted a large number of participants in research-based and service-oriented co-curricula activities.

The GTUHBP is integrated both horizontally and vertically: It has opportunities for participation by students at all levels, and in all majors. She has established a sizeable set of collaborations, both within Georgia Tech and in the broader beekeeping and informal science education communities. Jennifer introduces underclassmen to the GTUHBP in the Biomolecular Engineering Science and Technology (BEST) section of GT 1000 for which she is the instructor. This is part of a small NSF-sponsored scholarship and living-learning community. This serves as a terrific vehicle to introduce entering students to scientific inquiry and interdisciplinarity. She has the opportunity to further engage students in COS 2000, a seminar course that introduces general research methods and responsible conduct of research. Students have engaged in undergraduate research on the project with Jennifer, as well as with a series of collaborators from across CoS, CoE and CoC (I expect that students form CoB and IAC will be involved before too long!) For example, undergraduate Cassidy Swain describes his project in a group of electrical engineering and computer science students:

> *"…working on this project allowed me to complete interdisciplinary work. In general, this is something that I was sad to see a lack of at Tech. This program allowed me to turn an interest in bees and science into a project (and later a senior design project) that connected me with scientists and engineers in the 'real world'. This was an important aspect to me because I am interested in pursuing a career in computer science that augments the use and research of the more traditional sciences.*
>
> *I am of the opinion that this program created by Dr. Leavey, and Dr. Leavey herself, are excellent resources for facilitating an environment in which people from all levels and areas of study can contribute to science using their interests."*

Engaging students early in their Tech experience in authentic research and providing pathways to transition into the research laboratories provides them with exceptional opportunities. The program also allows participants to place science in a societal context through communication with the Atlanta community though a series of activities, including participation in the Atlanta Science Tavern, the Atlanta Science Festival, and with the local (and not-so-local) beekeeping

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communities. Letters of support from Marc Merlin and Cindy Hodges address these features of the project. Jennifer has been a pioneer in Georgia Tech's crowd source funding vehicle "Georgia Tech Starter".

The impact of the project on students, even at this early stage in its development, is impressive. When her students give presentations, there is a genuine enthusiasm for science as well as a certain self-confidence in their abilities that are uncommon in underclassmen. Put simply, Jennifer has realized an exemplary and impactful way to engage students in inquiry and research-based learning. The institute and the College of Sciences seized an opportunity that was presented by the opening of the Clough Undergraduate Learning Commons to create the new non-tenure track faculty position of Interdisciplinary Science Curriculum Coordinator. What Jennifer has managed to innovate in this new position is very, very special. The presentation of the 2014 Innovation in Co-Curricular Education Award to Dr. Jennifer Leavey would be fitting recognition of her accomplishments, and make a strong statement of the value that the institute places on creation of new and impactful programs to engage and inspire our undergraduate students.

Yours sincerely,

David M. Collard
Professor, School of Chemistry and Biochemistry
Associate Dean, College of Sciences

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Project Description: The Georgia Tech Urban Honey Bee Project
Dr. Jennifer Leavey

Objectives

The Georgia Tech Urban Honey Bee Project (GTUHBP) was established in April 2013 by the College of Sciences and is a co-curricular research model system and outreach program available for use by course instructors, individual GT faculty, students, and staff. It was initially created to provide an authentic research model system for use in introductory level science laboratory courses in the Clough Undergraduate Learning Commons but has expanded rapidly due to robust interest in the program. They key components are:

1) Authentic research on the effect of urban habitats on honey bees, conducted by undergraduates, grad students and summer research associates (high school teachers and students), both in the context of courses and independent work.

2) GT "inreach" in which students, faculty and staff can be trained in beekeeping and help maintain the GTUHBP apiary. Our volunteer training program includes two one-hour non-credit classes and weekly hands-on hive inspections.

3) Outreach to local schools and communities through presentations on honey bee biology and conservation.

Intended Audience

The Georgia Tech Urban Honey Bee Project has impacted many different populations of students on and off campus. Here is a summary:

ECE 2883 HPC, Fall 2013- Students in Dr. Tom Collins' digital design course collaborated with the GTUHBP to design a beehive traffic sensor using a vision chip known as the Centeye "stonyman" camera. Flow of bees into and out of the hive could monitored using this device. The students designing this device formed an interdisciplinary team with EE, CS, IE and BME majors.

Senior Design:

Fall 2013 - CS Majors Andrew Dehn and Cassidy Swain along with ECE majors Jason Morelli-Harland and Astor Castelo created a "smart hive" device that allows for remote monitoring of beehive activity over the internet. The device has integrated temperature and weight sensors. The device was designed to be low cost and wireless and will allow beekeepers to monitor winter food stores without putting the colonies in danger by opening the hive in cold weather. Weight data can also be used to monitor bee behavior.

Undergraduate Research:

Spring 2014 -

Courtney O'Gorman, a senior CHBE major, is volunteering with Dr. Peter Ludovice to explore new strategies to reduce honey viscosity during extraction and bottling.

Meredith Green, a senior BIOL major, is completing her senior research experience examining the effect of urban environments on the levels of heavy metals in honey.

Youngmin Kim, a sophomore BIOL major, is continuing her work creating a GIS-enabled survey of bee-flower interactions on the Georgia Tech campus.

Fall 2013 -
Miranda Gore, a senior BIOL major, developed a protocol to identify the floral sources of honey by purification and amplification of pollen DNA.

Summer 2013 -
Arabia Mountain High School teacher Kwami Omi and three of his students worked on the bees as part of the GIFT program. Mr. Omi helped the students develop experiments to determine how atmospheric pollutants can affect honey bee communication.

GT1000 - The GTUHBP gave workshops to two sections of GT1000 in Fall 2013.

Volunteer training program - Community interest in the GTUHBP has been overwhelming. There are currently over 340 people signed up for our mailing list, 124 of whom have indicated interest in volunteering. Over 30 people have attended both of our volunteer-training courses, and volunteers have logged more than 150 hours of outreach activities. Volunteers include Georgia Tech undergraduate and graduate students, faculty and staff. The training program consists of two one-hour courses and weekly hive inspections. The first of the two courses is an introduction to the GTUHBP highlighting the goals and ongoing activities of the project. The second course is intro to beekeeping. Which covers basic honey bee biology, safety and animal handling techniques. Weekly hive inspections are held in which volunteers open the GTUHBP beehives and look for food stores, brood production and signs of disease. After completing both classes and three hive inspections, volunteers are considered "fully trained" and can propose independent projects with the bees if desired.

Graduate Student Collaborations - The GTUHBP has collaborated with graduate students studying ME, Physics, and Biology. Guillermo Amador (David Hu's lab, ME) is studying how bees physically remove particulate matter such as pollen and powdered sugar from their body. Diana Chen (Flavio Fenton's lab, Physics) is interested in determining whether honey bee hives can be modeled as excitable dynamical systems. Interestingly, Karl Glastad (Michael Goodisman's lab, Biology) was recently awarded an NSF Doctoral Dissertation Improvement grant and included working with the GTUHBP as part of his broader impacts statement. He regularly helps maintain the GTUHBP hives.

Community outreach - GTUHBP volunteers staffed tables at the *Georgia Tech Earth Day* Celebration 2013, The Atlanta Mini Maker Faire 2013, The Ray Anderson foundation *Ray Day* celebration, and weekly at the *Georgia Tech Farmers Market* throughout 2013. Volunteers are trained to discuss environmental risks to honey bee populations as well as fundamentals of honey bee biology including colony structure and function. Volunteers also organized a screening of the swiss documentary *More Than Honey* on the Georgia Tech campus in October 2013. Jennifer Leavey served on a discussion panel at the Alliance

Francaise/Goethe-Zentrum screening of the same film. The GTUHBP was recently awarded a small grant from the GT School of Biology and the Elizabeth Smithgall Watts endowment to establish a collaboration with *Zoo Atlanta* to investigate which flowers are used as a food sources by urban bees like those at the zoo and at Georgia Tech. GTUHBP members are also active participants in the *Metro Atlanta Beekeepers Association*. There are also plans in the works for the GTUHBP to place beehives at the *English Avenue Urban Farm* and teach beekeeping classes to English Avenue residents.

K-12 outreach - GTUHBP volunteers have met with 5th graders from Drew Charter school participating in the HORIZONS summer program, Centennial Place Elementary 5th graders, 1st graders from the Westminster School, and Atlanta area school children as part of Kids@Kollege day. Each of these programs included brief presentations on honey bee biology and conservation and some included hive observations and hands-on time with beekeeping equipment. Additionally GTUHBP members gave a bee workshop for DeKalb county high school biology teachers attending a teacher development program at Arabia Mountain High School. Mr. Kwame Ome, who teaches biology at Arabia Mountain came to Georgia Tech during the summer of 2013 as part of the GIFT program and led a team of his students to develop a honey bee research project.

Curriculum development - Instructors in Chemistry and Biology are currently working on developing honey bee or honey-related activities for introductory-level lab courses. These units include experiments on the crystallization of honey and an inquiry-based module in which introductory biology students speculate on which features of flowers attract pollinators based on their own observations on campus. Their hypotheses will be tested using data compiled in our bee-flower GIS database.

<u>Targeted learning outcomes and assessment:</u>

The Georgia Tech Urban Honey Bee project has many targeted learning outcomes. Those outcomes that have been evaluated over the last year are below:

1) Increasing faculty/student/staff interaction through interdisciplinary research and outreach activities
2) Increasing GT community appreciation for animal pollinators and environmental factors that threaten them
3) Training volunteers capable of safely maintaining colonies of honey bees
4) Increasing the number of GT BS science alumni pursuing research-based careers
5) Improving STEM K-12 education through outreach activities

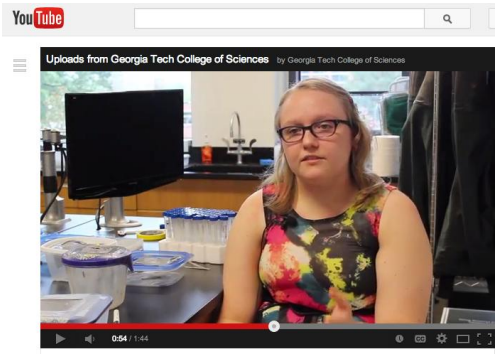
Assessment of #1 – In less than one year, the GTUHBP facilitated the development of one interdisciplinary team in an honors program digital design course, one interdisciplinary team in a senior design experience, and matched four sets of undergraduate researchers and mentors. In addition, the program held 23 hive inspections in which students, faculty and staff worked together to evaluate the health of the honey bee colonies.

Assessment of #2 – GTUHBP volunteers spent over 100 hours in direct contact with the GT community discussing the plight of honey bees at *Georgia Tech Earth Day* Celebration 2013, The Atlanta Mini Maker Faire 2013, at the screening of the swiss documentary *More Than Honey,* and weekly at the *Georgia Tech Farmers Market* throughout 2013. In addition, GTUHBP member Meredith Greene wrote an review article on colony collapse disorder for the public website bees.gatech.edu .

Assessment of #3 – GTUHBP volunteers have safely maintained three honey bee colonies on the roof of the Clough Undergraduate Learning Commons since April 20, 2013. Thirty-one students, faculty, staff and community members have attended the intro to the GTUHBP course and the intro to beekeeping course.

Assessment of #4 – While the Georgia Tech Urban Honey Bee Project is new, there has been some success encouraging students to pursue research careers so far. Meredith Greene, a senior biology major has applied to several graduate programs in which she can study the ecology of honey bees. Because a picture is worth a thousand words, please watch the following video in which Meredith talks about the impact of the project on her.

http://www.youtube.com/watch?v=dHrJmyBnjG8



Assessment of #5 - GTUHBP volunteers conducted four outreach programs for elementary-aged children in the past year impacting nearly 300 children. In addition, three high school students came to Georgia Tech and developed and executed their own honey bee-related research projects in Summer 2013.

<u>Approach taken</u>

The Georgia Tech Urban Honey Bee Project functions as a service unit to the Georgia Tech community, providing opportunities to students, faculty and staff. Undergraduates are able to have introductory research experiences through their course work or independently. Students faculty and staff can learn about honey bee biology and beekeeping through our volunteer training program. Student, faculty and staff volunteers help to maintain the hives and to provide outreach to schools and to the community.

Zimbra dc40@mail.gatech.edu

Re: support for award nomination - Jennifer Leavey

From : Meredith L Greene <meredithgreene@gatech.edu> Thu, Jan 23, 2014 12:32 PM
Subject : Re: support for award nomination - Jennifer Leavey
To : David M Collard <david.collard@chemistry.gatech.edu>

Hi Dr. Collard,

Sorry for the late response. I'd absolutely love to talk about Dr. Leavey and the GTUHBP; I already talk about what an amazing experience it is constantly.

I have greatly enjoyed learning apiculture as a hobby. I love being able to put on a bee suit and help take care of 30,000 industrious ladies, even if I get stung every so often. It has been incredibly useful to me in that respect, as I have had the opportunity to essentially apprentice under Dr. Leavey and learn a useful and unusual skill. If that were as deep as my experience went I would still be incredibly grateful because of the skills I've learned and the friendships I've made.

I can't really identify what it is that attracted me to the idea of working with the bees so much, all I know is that I was excited as soon as I read the email announcing the GTUHBP. Afterwards I found myself thinking about bees with increasing frequency, and I started to voraciously read everything I could about them. I had so many questions, and not all of them were answered, even by primary literature. This was when I started to realize that I wanted to be the one to answer these questions. The biggest impact GTUHBP has had on me is that it has allowed me to really delve deep into undergraduate research. I have been able to turn this thirst for knowledge into something productive. The fact that the GTUHBP isn't attached to a specific department but the College of Sciences as a whole really means that there is a huge range of disciplines that can be explored using the bees. Over the summer of 2013 I conducted an awesome experiment with a microbiologist from Georgia State, essentially testing whether a bacterial strain they had isolated had any negative effects on bees. The research showed me that beneficial relationships between insects and microbes are interesting, and directly led me to pursue coursework exploring those topics. This became a general theme with my experiences with the GTUHBP. The bees really are a great way to dive into different fields and interdisciplinary research. Through the support of Dr. Leavey and the GTUHBP I am now conducting independent research exploring heavy metal pollution in Atlanta using honeybees as bioindicators. It really is a collaborative effort; my research adviser is in the Biology department but I am also working closely with a professor in the Earth and Atmospheric Sciences department. If you had told me this time last year that I would be happily conducting research that heavily uses my old chemistry lab skills I would have been highly skeptical. But I am now happily spending my mornings performing extractions, all in the name of science.

Working with the GTUHBP ignited a passion for research that I hope to carry into a career in academic research. Becoming involved with the GTUHBP radically changed the course of the graduate education I am pursuing, and completely reassured me that it is the right path for me. I have been interested in ecology for a long time, but it was difficult to find a research niche at GT that felt right for me. After working with the bees I realized how interested I was in pollinator and insect ecology, so I was able to focus my energy on finding the best programs in those areas. The undergraduate research I was able to perform greatly strengthened my applications, and I can't fathom what a different position I would be in today if I hadn't began working with GTUHBP. It really has been a uniquely transformative experience. I can't be thankful enough both to Dr. Leavey for spearheading the project, and to the administration for letting it become reality.

Let me know if I can do anything else to help, I'd love to do so.

Meredith Green

Zimbra **dc40@mail.gatech.edu**

Re: support for award nomination - Jennifer Leavey

From :	Katelyn Sturdivant <ksa.sturdivant@gmail.com>	Wed, Jan 15, 2014 11:48 AM
Subject :	Re: support for award nomination - Jennifer Leavey	
To :	David M Collard <david.collard@chemistry.gatech.edu>	
Reply To :	ksa sturdivant <ksa.sturdivant@gmail.com>	

Hi Dr. Collard!

I would be happy to write a letter for Dr. Leavey!

As part of the GT Urban Honey Bee Project, I worked to bring awareness to the importance of honey bees and their impact on our daily lives. I helped out at the GT Farmers Market where we sold local honey as a fund raiser for the GTUHBP and spoke with those interested in honey bees about the different ways they could get involved in the project. Some examples of these opportunities include helping out at the Farmers Market, conducting hive inspections, attending introductory beekeeping classes, and assisting in outreach programs to local K-12 schools. In additional to helping out at the Farmers Market, I attended several hive inspections where I got to learn about honey bee development and behavior in addition to basic beekeeping skills. Being someone who enjoys doing various arts and crafts, Dr. Leavey gave me the task of designing and producing a display/advertisement for the UHBP which is currently on display in the Clough Undergraduate Learning Commons. I also presented on the UHBP at the GT College of Sciences Homecoming celebration along with Meredith Greene and Miranda Gore. The presentation consisted of an overview of the project and summaries of the current research projects being conducted by undergraduates.

Working with the GTUHBP was a great experience in which I not only learned more about honey bees but I also learned how every discipline of science ties into every system. As a Biology major, my first approach to understanding an unfamiliar topic in science was to view the topic from what I subconsciously assumed was a strictly biological perspective. For example, with the honey bees, the first questions that came to mind were along the lines of "How does this organism fit into the food chain?", "How does the social structure of the bees affect their sexual reproduction?", and "What is the process honey bees perform in order to produce the honey?" I never gave much conscious thought to the fact that multiple disciplines in science make up the answers to these questions. The GTUHBP made me more aware of how all science works together to make up the systems around us and was an opportunity to work with these various disciplines firsthand.

Thank you,
Katelyn

Zimbra **dc40@mail.gatech.edu**

Re: support for award nomination - Jennifer Leavey

From :	Youngmin Kim <my0417098@yahoo.com>	Sun, Jan 19, 2014 08:18 PM
Subject :	Re: support for award nomination - Jennifer Leavey	
To :	David M Collard <david.collard@chemistry.gatech.edu>, ykim483@gatech.edu	
Reply To :	Youngmin Kim <my0417098@yahoo.com>	

I worked as Dr. Jennifer Leavey's student research assistance and involved in independent undergraduate research on introductory honey bee (apis mellifera) research that mainly focused on honey bee's foraging behavior pattern in urban garden environment and DNA barcoding of flower pollens that contained in honey to prove the consistence throughout the data we collected around Georgia Tech garden.
I have worked with Dr. Leavey almost for a year now, and I always have appreciated working with her. In the beginning of my summer research when we started our very first research together under Georgia Urban Honey Bee Project, we faced many problems concerning the experiment protocols and limited access for expensive tools such as computer-based bee tracking sensors. Dr. Leavey always came up with great ideas adopting relatively inexpensive (or simpler) tools and still maximizing the efficiency of the data collection and she knew exactly what was the best to improve the quality of the experiment.
She has a very innovative way of thinking to utilize the resources that are already provided by Georgia Tech, or some other things that has a possibility to become a great resource but not many people have realized of utilizing on them. For example, to learn species names of flowers that are found in Georgia Tech garden, we got some help from Georgia Tech landscape and gardening department, and to visualize honey bee's visiting frequency in Georgia Tech garden, we borrowed some help from Georgia Tech school of Architecture and adopted Arc GIS software to spot bees on Georgia Tech school map and analyze their flower visitation pattern. I believe that all of these innovative thoughts toward science was not purely her luck, but based on her hard research, and investment of her time on the research.
Before I worked with Dr. Leavey I thought scientific research as just an individual's work that only purposes on discovering the facts or arguing an individual's thoery. However, by working beside with Dr. Leavey my perspective of research has evolved to realized that scientific research was more of a group work, and scientists should always try hard to become innovative by following new trends of research by adopting new technologies and exchanging ideas with people from other professions because both allows them to expand their views on the topic they research on which allow the experiment to be more creative, and compromising.
I would like to thank Dr. Jennifer Leavey for showing me how to think as a modern scientist, and how everything is inter-connected. It was a great experience working with her, and I learned that science is not stationary, but is continuously developed by adding opinions from other experts that will make science approachable by anybody in modern world.

January 16, 2014

Dear Awards Committee Members,

I am Marc Merlin, the Director of the Atlanta Science Tavern, Atlanta's premier grassroots public science forum, organized on Meetup.com, now with over 3,700 members. In that capacity it is a pleasure for me to write you to add my voice to the endorsements of Jennifer Leavey for Georgia Tech's Center for the Enhancement of Teaching and Learning "Innovation in Co-curricula Education Award."

My association with Jennifer began with our involvement in the early stages of the first citywide Atlanta Science Festival in 2012. It was clear from the outset how committed Jennifer was to public science outreach. What became apparent over the period of our collaboration is the energy and creativity that Jennifer brings to bear in her efforts for informal science education. It also became clear how much Jennifer values community involvement in this kind of work. In addition, working with Jennifer in reviewing student and faculty funding applications for the Festival, I have learned that she is an effective planner and organizer.

My group itself has benefited directly from Jennifer's commitment to science outreach. In November 2013 she appeared with Dennis Krusac of the US Department of Agriculture Forrest Service to lead a discussion at a screening of the documentary film "More Than Honey" at the Alliance Française/Goethe Zentrum auditorium in Midtown Atlanta, This event was hosted by the Swiss Consulate in Atlanta as part of the ongoing Atlanta European Science Cafe series which I help to coordinate. It drew a crowd of 120 people who enjoyed hearing Jennifer discuss the GT Urban Honeybee Project and assist Dennis in answering other questions about the movie and about Colony Collapse Disorder.

Do not hesitate to contact me if you have any questions for me with regard to Jennifer's nomination for this award. I cannot speak highly enough of her.

Sincerely,

Marc Merlin, Director
Atlanta Science Tavern
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404.492.6112

Dr. Terry Snell
Professor and Chair
School of Biology
Atlanta, Georgia 30332-0230 USA
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Email: terry.snell@biology.gatech.edu

January 22, 2014

To whom it may concern:

I am writing in support Dr. Jennifer Leavey's nomination for the CETL Innovation in Co-curricula Education Award. Dr. Leavey came to Georgia Tech in 2005 as an Academic Professional in the School of Biology. Her primary responsibilities were coordinating advising, lecturing in cell biology and microbiology, and supervising other Biology Academic Professionals. Since 2012, Dr. Leavey has served as Integrated Science Coordinator for the College of Sciences. It is in this role that Dr. Leavey's creative spirit was truly unleashed and she has developed a variety of programs to better integrate the teaching of introductory science courses. I will focus on one program that has been especially important to the School of Biology: the urban honey bee project.

The Georgia Tech Urban Honey Bee Project seeks to unite interdisciplinary undergraduate research and education using honey bees as a model. Led by Dr. Leavey, this group is investigating the impact of urban habitats on honey bees, using hives that are located on the roof of the Clough Undergraduate Learning Commons. Sustainable food production systems are being integrated into more urban environments, raising questions about what factors limit food production in these habitats. Availability of animal pollinators is a key factor affecting crop yields in urban gardens. Bees are the primary pollinators of many food crops and are excellent model organisms for understanding complex biological systems. Bee populations are increasingly threatened worldwide by pesticides, habitat fragmentation, and disease. Consequently, a greater understanding of honeybees would be of great ecological, economic, and academic interest.

Dr. Leavey has developed a variety of teaching modules for introductory biology, chemistry, physics using the honey bee system. She also has engaged engineers in various aspects of recording data about the hives and bee movements. These activities have so enthralled some of our some undergrads, that they are performing independent research projects under the mentorship of research faculty. Moreover, the honey bee project has increased student engagement and involvement in introductory science courses by demonstrating the economic and social relevance of research and emphasizing its urgency. Interactions between faculty and students of different academic units has also increased and outreach has engaged a variety of community partners. This project has taken vision, courage and determination to launch and sustain. Dr. Leavey almost single-handedly has made the program a success and now there is a buzz in the introductory classes about the project.

Dr. Leavey is an important force in improving undergraduate instruction in the College of Sciences and has developed a creative model that benefits all instructors of introductory science classes. The honey bee project motivates our students and engages them in socially and scientifically relevant activities that are easy for them to relate to. We are all better off for her imagination and drive. It is therefore my pleasure to enthusiastically recommend her for the CETL Innovation in Co-curricula Education Award.

Sincerely,

Terry W. Snell

Terry W. Snell, Chair

School of Biology

I am writing in support of Dr. Jennifer Leavey's nomination for Georgia Tech's "Innovation in Co-curricula Education Award."

Dr. Leavey has not only persevered in creating and executing The Georgia Tech Urban Honey Bee Project, she has also shown her eagerness to continue learning and sharing this project with students of all ages and in different fields of study through the University and beyond. The interdisciplinary opportunities of working with honey bees are boundless, and Dr. Leavey's willingness to think "outside the box" in all areas is demonstrated in the many and varied student research projects that are currently taking place.

Just over a year ago, Dr. Leavey proposed this project and worked diligently to make it possible. In this short period of time, numerous students have been drawn into the program through the availability of new research potential and Dr. Leavey's enthusiastic support. Her charismatic personality keeps the students motivated to continue learning and creating in this program. The high interest, multi-field participation, and interdisciplinary collaboration within the Honey Bee Project demonstrate the excitement for this program on campus. The many different fields of study that are taking advantage of this learning opportunity contribute and expand the Georgia Tech reputation both within the community and with other institutions of learning.

I have personal experience with Dr. Leavey's outreach through more than one venue. She is an active member of the Metro Atlanta Beekeepers Association. She often brings students to meetings to expand their practical beekeeping knowledge. With Dr. Leavey's encouragement, one undergraduate student applied for and received an essay scholarship to the Metro Atlanta Beekeeping Short Course held at the Atlanta Botanical Garden.

She has worked with the entire first grade class at The Westminster Schools, educating and enlightening them about the program on Georgia Tech's campus. Youth represent the potential future of honey bees, and she is an excellent proponent of honey bee potential.

She has spoken about honey bees at several off campus meetings, and has also hosted several showings of an international documentary bee film with community members invited to attend and discuss its content.

The beekeeping community appreciates her hard work and creativity with the Georgia Tech Urban Honey Bee Project. I strongly support Dr. Leavey's nomination for Georgia Tech's "Innovation in Co-curricula Education Award."

Thank you,

Cindy Hodges
President-Metro Atlanta Beekeepers Association
Master Beekeeper
2012 Georgia Beekeeper of the Year