

**Nathan K. Hepler**  
208 Mueller Laboratory  
University Park, PA 16802  
(717) 644-1619 nkh117@psu.edu

To whom it may concern,

I am currently completing my fourth year as a Ph.D. candidate in the Plant Biology program at Penn State University, where I am a student in Dr. Daniel Cosgrove's lab. As a member of the Botanical Society of America, I received a call for applications email regarding the APPS Reviewing Editor Board 2018-2020. APPS's goal to encourage communication among plant scientists is a commitment with which I wholeheartedly agree. For scientists of the 21<sup>st</sup> century, novel information and cutting edge discoveries should be quickly disseminated.

Throughout the course of my graduate studies, I have gained extensive experience in communicating scientific research, and I have a strong background in reviewing and editing. I am familiar with the peer-review process, having served as both an author and reviewer. Moreover, my research experiences span a number of relevant fields, including genetics, evolution and molecular biology. As a senior graduate student interested in further developing my skills as a critical reader and reviewer, serving as a member of this board would a unique and worthwhile opportunity. I believe that it is my duty as an academic to become more familiar and more comfortable with the editorial and peer-review processes. My desire to receive more hands-on editorial experience, combined with my relevant research experience, make me an ideal candidate for the Reviewing Editor Board.

It is my hope to graduate by May 2019, and based upon conversations with my adviser, this goal is achievable. Following graduation, I would like to work as a postdoctoral scholar for a short period of time in the Cosgrove lab. Realistically, I believe my time at Penn State will not conclude for another two years.

Thank you for taking the time to review my application. Should you have any additional questions, please do not hesitate to contact me using the contact information listed above. I look forward to hearing back from you soon.

Sincerely,

Nathan Hepler

# NATHAN HEPLER

Phone: (717) 644-1619  
Email: nkh117@psu.edu

208 Mueller Laboratory  
University Park, PA 16802

## EDUCATION

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- PhD** The Pennsylvania State University, Plant Biology May 2019 (Anticipated)  
Dissertation: “*in planta* Analysis of Expansin Function”  
GPA: 3.98  
Advisor: Dr. Daniel J. Cosgrove
- BS** Lebanon Valley College, Biochemistry and Molecular Biology May 2013  
Graduated Cum Laude  
GPA: 3.53

## RESEARCH EXPERIENCE

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**Dissertation**, The Pennsylvania State University, State College, PA 2014 – Present  
Advisor: Dr. Daniel J. Cosgrove

- Studied expansin gene superfamily evolution in monocot species using phylogenetic methodologies, specifically focusing on aquatic plants *Spirodela polyrhiza* and *Zostera marina*.
- Explored *in planta* functions of *Arabidopsis thaliana* expansin genes through the generation of CRISPR/Cas9-mediated knock out plants.
- Utilized *in vitro* evolution for identifying novel amino acid mutations which confer increased cellulose affinity in the bacterial expansin carbohydrate binding domain.

**National Institutes of Health**, Bethesda, MD 2013 – 2014

**Postbaccalaureate Researcher**, Lab of Dr. Stephen H. Leppla

- Assessed the role of AtxA in *Bacillus anthracis* toxin production through PCR-based promoter deletion analysis.
- Modified plasmids and bacterial growth conditions for maximizing recombinant protein production.

**Lebanon Valley College**, Annville, PA 2011 – 2013

**Undergraduate Research Assistant**

- Isolated expansin genes using online genome databases, named and grouped based upon protein sequence homology.
- Built cladograms (Neighbor Joining, Maximum Parsimony, Bayesian) comparing *Selaginella moellendorffii* expansin sequences to those of bryophytes, gymnosperms and angiosperms.

- Generated RNA interference (RNAi) constructs through PCR amplification and ligation for targeting *Physcomitrella patens* expansin genes.

## TEACHING EXPERIENCE

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**The Pennsylvania State University**, University Park, PA Jan 2017 – Dec 2017  
**Laboratory Mentor**, Biology Department

- Managed the independent study of a senior undergraduate student during the course of two semesters.
- Developed daily work assignments and reviewed project goals weekly.
- Taught new laboratory techniques and explained complex methodologies.
- Reviewed and revised laboratory reports for facilitating developments in scientific writing.
- Provided comprehensive end of semester evaluations, highlighting successes, advancements, and areas which could be improved.

**The Pennsylvania State University**, University Park, PA Jan 2016 – May 2016  
**Teaching Assistant**, Biology Department

- Organized and led laboratory discussions for two classes of approximately 22 students.
- Developed and graded laboratory quizzes.
- Graded reports and short writing assignments.

## PUBLICATIONS

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### *Academic Journal Publications*

3. Pomerantsev AP, McCall RM, Chahoud M, **Hepler NK**, Fattah R, Leppla SH (2017) Genome engineering in *Bacillus anthracis* using tyrosine site-specific recombinases. *PLOS ONE*, **12**(8): e0183346.
2. Cosgrove DJ, **Hepler NK**, Wagner ER, Durachko DM (2017) Measuring the biomechanical loosening action of bacterial expansins on paper and plant cell walls. *Methods in Molecular Biology*, **1588**:157-165.
1. Carey RE, **Hepler NK**, Cosgrove DJ (2013) *Selaginella moellendorffii* has a reduced and highly conserved expansin superfamily with genes more closely related to angiosperms than to bryophytes. *BMC Plant Biology*, **13**:4.

### *Creative Journal Publications*

2. Hepler, Nathan. "Socks", *Poydras Review*. Web. 7 May 2013.
1. Hepler, Nathan. "A Glance at the Unseen", *Poydras Review*. Web. 17 Dec. 2012.

## PRESENTATIONS AND INVITED SEMINARS

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8. **Invited Speaker**, *CRISPR/Cas9-mediated genome editing reveals Arabidopsis thaliana expansin paralogs AtEXPA7 and AtEXPA18 function redundantly and are required for proper root hair formation*. 3<sup>rd</sup> Annual Life Science Symposium, The Pennsylvania State University. May 2018
7. **Poster Presentation**, *CRISPR/Cas9-mediated genome editing reveals Arabidopsis thaliana expansin paralogs AtEXPA7 and AtEXPA18 function redundantly and are required for proper root hair formation*. 3<sup>rd</sup> Annual Life Science Symposium, The Pennsylvania State University. May 2018
6. **Seminar**, *CRISPR/Cas9-mediated genome editing reveals Arabidopsis thaliana expansin paralogs AtEXPA7 and AtEXPA18 function redundantly and are required for proper root hair formation*. Plant Biology Seminar Series, The Pennsylvania State University. February 2018
5. **Poster Presentation**, *The Spirodela polyrhiza (Giant Duckweed) Expansin Superfamily: A Case of Massive Gene Loss*. ASPB Annual Meeting, Honolulu, HI. July 2017
4. **Poster Presentation**, *The Spirodela polyrhiza (Giant Duckweed) Expansin Superfamily: A Case of Massive Gene Loss*. Bioinformatics and Genomics Retreat Symposium, The Pennsylvania State University. August 2016
3. **Poster Presentation**, *The Spirodela polyrhiza (Giant Duckweed) Expansin Superfamily: A Case of Massive Gene Loss*. ASPB Mid-Atlantic Section Meeting, Swarthmore College. April 2016
2. **Poster Presentation**, *The Spirodela polyrhiza (Giant Duckweed) Expansin Superfamily: A Case of Massive Gene Loss*. Advances in Plant Genomics, Virtual Event. October 2015
1. **Poster Presentation**, *The Spirodela polyrhiza (Giant Duckweed) Expansin Superfamily: A Case of Massive Gene Loss*. Bioinformatics and Genomics Retreat Symposium, The Pennsylvania State University. August 2015

### *Upcoming*

**Poster Presentation**, *CRISPR/Cas9-mediated genome editing reveals Arabidopsis thaliana expansin paralogs AtEXPA7 and AtEXPA18 function redundantly and are required for proper root hair formation*. ASPB Annual Meeting, Montreal, Quebec, Canada. July 2018

**Invited Speaker**, *CRISPR/Cas9-mediated genome editing reveals Arabidopsis thaliana expansin paralogs AtEXPA7 and AtEXPA18 function redundantly and are required for proper root hair formation*. ASPB Annual Meeting, Montreal, Quebec, Canada. July 2018

## PROFESSIONAL TRAINING

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### **Intellectual Property Law and Policy: Part 1**

edX online course, University of Pennsylvania, April 2018

Description: Six-week course providing an in-depth description of intellectual property law, including the theories which underpin IP law, policy implications and case studies.

### **Intellectual Property Basics**

Udemy online course, April 2018

Description: Overview of intellectual property.

## PROFESSIONAL AFFILIATIONS

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American Association for the Advancement of Science, 2016 – Present

American Society of Plant Biologists, 2015 – Present

Northeast Section, 2015 – Present

Mid-Atlantic Section, 2015 – Present

Botanical Society of America, 2016 – Present

## HONORS AND AWARDS

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**Huck Institutes Graduate Travel Award** 2018

**National Science Foundation Graduate Research Fellowship** 2016 – 2019

**Huck Graduate Research Innovation Award** 2016  
\$5,000 research award.

**The Pennsylvania State University Graduate Fellowship** 2014 – 2015

**NIH Intramural Research Training Award** 2013 – 2014

**Owen A. Moe Biochemistry Award** 2013

**Beta Beta Beta National Biological Honors Society** 2010

**Lebanon Valley College Vickroy Scholarship** 2009 – 2013  
Scholarship providing ½ tuition.

**Eagle Scout Recognition Award** 2009 – 2013  
\$500 award towards tuition.

## PROFESSIONAL SERVICE

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### Peer-Reviewed Articles for:

- *Plant Molecular Biology*

## COMMUNITY SERVICE

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### Poster Judge

10<sup>th</sup> Annual Postdoc Research Exhibition, The Pennsylvania State University, September 2017

### Science Fair Judge

Pennsylvania Junior Academy of Science Annual Science Fair, May 2015-2018

### Poster Judge

Science Undergraduate Poster Exhibition, The Pennsylvania State University, October 2015

### Peer Mentor

Plant Biology Program, The Pennsylvania State University, 2015-Present

## COMPUTER SKILLS

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### Programming:

- Extensive experience analyzing and visualizing data using R
- Familiar with Python and Unix languages

### Applications:

- Highly proficient in using ImageJ, Adobe Illustrator and Adobe Photoshop
- Experience using bioinformatics programs MEGA, RAxML, PyMOL and PAML

### Platforms:

- Ability to work with MacOS, Windows and Linux operating systems

To whom it may concern,

I am writing in support of Nate Hepler who has applied to serve on the Plant Sciences Reviewing Editorial Board.

Nate has been a graduate student in my lab for ~ three years. He has excellent writing skills and others in the lab frequently rely on him to review and correct their manuscripts. He has expertise in the areas of molecular evolution of proteins, particularly expansins, and is generally knowledgeable about plant cell walls, plant development, and developmental genetics. I believe he would provide valuable service to the journal as well as gain valuable experience in editing and reviewing manuscripts.

In terms of organization, responsibility and punctuality, I would rank Nate in the top 10% of graduate students. He also tends to be helpful and constructive in his criticisms...he takes a balanced view, is not hypercritical as some students tend to be. Of course he is still relatively inexperienced, and his assessments tend to be qualified, rather than extreme. In the subject areas that I mentioned in my previous email, he has the ability to render an authoritative assessment, in a polite and respectful manner.

I recommend him without reservation.

Daniel Cosgrove  
Professor of Biology  
Penn State University