Amanda Haage, PhD – Assistant Professor

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Current Position

University of North Dakota **May 2019 – Present**
Assistant Professor – Biomedical Sciences

I am currently an education scholar track assistant professor in biomedical sciences at the University of North Dakota. This means my primary duty is developing and teaching a large enrollment anatomy and physiology course for mostly pre-health undergraduates. I am passionate about active learning and diversity and inclusion in science education. I am also developing my own research lab. Here I want to merge the concept of microenvironmental regulation of cellular behavior from my PhD work with my new loves of *in vivo* work, quantitative imaging, and primary cell culture systems gained from my post-doctoral work. I will be focusing on neural crest migration. Much of the genetic networks that function and change during neural crest migration and subsequent differentiation is well studied, but this does not give a complete picture of how neural crest migration is regulated. Additionally, several highly metastatic cancers are derived from the neural crest, providing a translational aspect to my work.

Education

Wartburg College **Aug. 2006 – May 2010**
B.A. in Biology

Iowa State University **Aug. 2010 – July 2014**
Ph.D in Molecular, Cellular & Developmental Biology
PI: Ian Schneider
Department of Chemical & Biological Engineering

Previous Research Experience

University of British Columbia **Sept. 2014 – May 2019**
Post-Doctoral Research
PI: Guy Tanentzapf
Department of Cellular & Physiological Sciences
Talin Function in Mammalian Development & Homeostasis – Here I completed the initial characterization of several novel transgenic mouse lines containing different functional mutations in the gene *Talin-1*. This included extensive *in vivo* work, the utilization of various quantitative imaging approaches, and the establishment of several primary cell culture systems.

Iowa State University **Aug. 2010 – July 2014**
Ph.D Thesis Research
PI: Ian Schneider
Department of Chemical & Biological Engineering

Microenvironment Regulation of Matrix Metalloproteinase Activity in Pancreatic Cancer Cells – Here I was able to demonstrate the novel regulation of matrix metalloproteinase activity by extracellular matrix stiffness and cellular contractility. I was able to further show this response is specifically mediated by membrane-tethered proteinases, which in turn activate secreted proteinases in response to mechanical stimuli. This included use of various pancreatic cancer cell lines and extracellular matrix scaffolds in conjunction with live imaging and fluorescent reporter assays.

Wartburg College **Jan. 2009 – Dec. 2009**
Senior Undergraduate Research
PI: J. Keith McClung
Department of Biology
The effects of RNA Interference on Prohibitin in MCF-7 Cells – Here I completed knockdown studies of the cancer-associated gene, *Prohibitin* in human breast cancer cells. This included learning mammalian cell culture, utilizing the then emerging technology of RNAi, and measuring proliferation as a readout for cancerous potential.

Iowa State University **June 2008 – Aug. 2008**
Undergraduate Summer Research Experience
PI: Diane Bassham
Department of Genetics, Development & Cell Biology
A Study of Gene Expression in Arabidopsis thaliana wrky65 Knockout Plants – Here I extracted RNA from mutant and control plant stains under different environmental stress conditions. This helped to create a gene expression profile examining the role of autophagy-related genes in stress response.

Awards

Best Talk **2019**
University of British Columbia CELLS Retreat

Research Excellence Award **2014**
Iowa State University

Summa Cum Laude **2014**
Iowa State University

Publications – My NCBI

8. **Haage A.,** Wagner K., Deng W., Venkatesh B., Mitchell C., Goodwin K., Bogutz A., Lefebvre L., Van Raamsdonk C.D., & Tanentzapf G. Precise Coordination of Cell-ECM Adhesion is Essential for Efficient Melanoblast Migration During Development. *Development*. (2020). Accepted June 8th 2020.

7. Fernandes J.D., Sarabipour S., Smith C.T., Niemi N.M., Jadavji N.M., Kozik A.J., Holehouse A.S., Pejaver V., Symmons O., Bisson Filho A.W., **Haage A.** Insights from a survey-based analysis of the academic job market. *eLife*. (2020). Accepted June 3rd 2020.

6. Fu L., **Haage A.,** Kong N., Tanentzapf G., & Li H. Dynamic protein hydrogels with reversibly tunable stiffness regulate human lung fibroblast spreading reversibly. *Chemical Communications.* (2019).

5. Camp D., **Haage A.,** Solianova V., Castle W.M., Xu Q.A., Lostchuck E., Goult B.T. & Tanentzapf G. Direct binding of talin to Rap1 is required for cell-ECM adhesion in drosophila. *J. Cell Sci.* (2018).

4. **Haage A.,** Goodwin K., Whitewood A., Camp D., Bogutz A., Turner C.T., Granville D.J., Lefebvre L., Plotnikov S., Goult B.T. & Tanentzapf G. Talin autoinhibition regulates cell-ECM adhesion dynamics and wound healing in vivo. *Cell Reports.* (2018).

3. **Haage A.,** Nam D.H., Ge X. & Schneider I.C. A function blocking antibody reveals matrix metalloproteinase-14 as a force-regulated proteinase. *Biochem Biophys Res Commun.* (2014).

2. **Haage, A.** & Schneider I.C. Cellular contractility and extracellular matrix stiffness regulate matrix metalloproteinase activity in pancreatic cancer cells. *FASEB J.* (2014).

1. Zhang Y., **Haage A.,** Whitley E.M., Schneider I.C. & Clapp A.R. Mixed-surface, lipid-tethered quantum dots for targeting cells and tissues. *Colloids and Surfaces, B. Biointerfaces.* (2012).

Grants

Awarded

2. *Graduate Research Training Initiative for Student Enhancement Preparation.* Agency: UND Grand Challenges Seed Funding. Role: Co-I. Amount: $10,000 / 1 year. 5/8/2020

1. ND-ACES: New Discoveries in the Advanced Interface of Computation, Engineering, and Science. Agency: NSF:EPSCoR. Role: Funded Participant. Amount: $20,000,000 / 5 years. 4/20/20202

In Preparation

- NSF:IUSE – Intercultural Knowledge and Skills in Pre-Health Curriculum — Aug. 2020
- R03 – Microenvironmental Regulation of Neural Crest Migration — Oct. 2020
- NIH:G-Rise – TBD — May. 2021
- NSF:AGEP – Creating a Transparent Academic Job Market to Increase Equity — Dec. 2021

Teaching Experience

Course Design & Implementation **Aug. 2019 – Present, University of North Dakota**

While lecturing in my current position I have developed a new two semester sequence of human anatomy and physiology courses with corresponding labs. They will be implemented starting in fall 2020. These courses are the first and only STEM courses at the University of North Dakota to fulfill the essential studies requirement of "diversity of human experience". They focus on how biological variation impacts the human experience, as well as how medicine and culture influence each other. These courses are designed around evidence based best practices, and implement aspects of gamification.

Lecturing

Aug. 2019 – May 2020, University of North Dakota
Oct. 2018 – University British Columbia
March 2014 – Iowa State University
Oct. 2013 – Iowa State University

My current position started with me serving as instructor of record for a lecture-based course entitled Anatomy for Paramedical Personnel. I taught this course for two semesters. Prior to my current position, I lectured for large undergraduate courses several times; twice at the invitation of my supervisors and once as the practical experience required for my certificate in graduate student teaching (see below). I gave two lectures as part of a Human Microscopic Anatomy course during my post-doctoral training and lectured for a Principles of Molecular Cell Biology course and a Biomedical Engineering course at Iowa State University during my PhD.

Scientists Teaching Science Course **Summer 2018 – New York Academy of Sciences**

I independently sought additional training in teaching during my post-doctoral work in preparation for my applications to primary undergraduate institutions. This online course offered by the New York Academy of Sciences was extremely relevant and insightful. With this experience I feel very prepared to tackle designing my own course or implementing active learning strategies in existing course. See full course description here: https://www.nyas.org/events/2018/scientists-teaching-science-online-course/

Graduate Student Teaching Certificate **2012 – 2014 – Iowa state University**

Through this certificate program I took 3 courses on teaching pedagogy including, Educational Psychology, Foundations of Digital Learning, and College Teaching. I also completed a practicum where I lectured for a large Principles of Molecular Cell Biology course. See program description here: http://www.celt.iastate.edu/graduate-students-postdocs/graduate-student-teaching-certificate

Teaching Assistant **2013 – 2014 – Iowa state University**

I independently taught two sections of a Principles of Biology Laboratory course intended for first year undergraduates. This included mini lectures, setting up activities/dissections, demonstrating activities/dissections and grading.

Secondary Science Education Major **2006 – 2009 – Wartburg College**

I started my undergraduate career at Wartburg College as a secondary science education major, intent on teaching high school science. I completed much of the major requirements before deciding to go to graduate school in my 4th year.

Supplemental Instruction Leader **2007 – 2008 – Wartburg College**

This position combined the duties of a teaching assistant and a tutor for an introductory biology lecture course. I completed one-on-one tutoring sessions when requested by students. I also held weekly review sessions on course material and extra review sessions prior to exams.

Mentoring Experience

Directed Studies Students **2015 – 2019**

University of British Columbia
Total number of students = 5

Here students can register for a one or two semester course to carry out an individual research project in a faculty member's research lab. To date, I have mentored 5 students in completing independent projects that fit under the overall umbrella of my research interests. Some of these students will be included on future publications and have presented their work at international conferences (see below).

Undergraduate Research Experience Program **2017 – 2019**
University of British Columbia
Total number of projects = 2

This program matches undergraduate students with little to no research experience, typically in groups of 2-4, with a graduate student or postdoctoral fellow in their field. Under their guidance, they develop a theoretical research project that is presented at the University of British Columbia's Multidisciplinary Undergraduate Research Conference. I have participated as a mentor for two years, supervising two groups of 5 students each. A description of the program can be found here: http://www.uroubc.ca/rex/

Undergraduate Student Presentations **2016 – Present**

2. Mitchell C., **Haage A.,** Wagner K., Goodwin K., Bogutz A., Lefebvre L., Van Raamsdonk C.D. & Tanentzapf G. Talin autoinhibition regulates primary melanocyte cell-ECM adhesion. Poster presented at: Northwest Developmental Biology Meeting, March 2018, Friday Harbor, Washington, USA.

1. Webster R., **Haage A.,** Goodwin K., Bogutz A., Lefebvre L. & Tanentzapf G. Lack of talin autoinhibition increases cell-extracellular matrix adhesion. Poster presented at: Northwest Developmental Biology Meeting, March 2016, Friday Harbor, Washington, USA.

Conference Presentations

Professional Conference Talks:

3. **Haage A.,** Mitchell C., Wagner K., Goodwin K., Bogutz A., Lefebvre L., Van Raamsdonk C.D. & Tanentzapf G. Cell-ECM adhesion regulates melanoblast migration during development. Society for Developmental Biology Annual Meeting. July 2018, Portland, Oregon, USA.

2. **Haage A.,** Goodwin K., Bogutz A., Lefebvre L., Plotnikov S. & Tanentzapf G. Talin autoinhibition regulates cell behavior and migration in vivo. Northwest Developmental Biology Meeting. March 2017, Friday Harbor, Washington, USA.

1. **Haage A.,** Goodwin K., Bogutz A., Lefebvre L. & Tanentzapf G. Modulation of integrin-based cell-matrix adhesion via talin autoinhibition regulates cell behavior and migration in vivo. Gordon Research Seminar: Fibronectin, Integrins & Related Molecules. February 2017. Ventura, California, USA.

Professional Conference Posters:

10. Fernandes J.D., Sarabipour S., Smith C.T., Niemi N.M., Jadavji N.M., Kozik A.J., Holehouse A.S., Pejaver V., Symmons O., Bisson Filho A.W., **Haage A.** Insights from a survey-based analysis of the academic job market. American Society for Cell Biology Annual Meeting. December 2019. Washington, DC, USA.

9. **Haage A.,**, Wagner K., Goodwin K., Mitchell C., Bogutz A., Lefebvre L., Van Raamsdonk C.D. & Tanentzapf G. Cell-ECM adhesion regulates melanoblast migration during mammalian morphogenesis. American Society for Cell Biology Annual Meeting. December 2018. San Diego, California, USA.

8. **Haage A.,** Goodwin K., Whitewood A., Camp D., Bogutz A., Turner C.T., Granville D.J., Lefebvre L., Plotnikov S., Goult B.T. & Tanentzapf G. Talin autoinhibition regulates cell behavior and migration in vivo. Biophysical Society of Canada Annual Meeting. May 2018. Vancouver, British Columbia, Canada.

7. **Haage A.,** Goodwin K., Bogutz A., Lefebvre L., Plotnikov S., Goult B.T. & Tanentzapf G. Talin autoinhibition regulates cell behavior and migration in vivo. American Society for Cell Biology Annual Meeting. December 2017. Philadelphia, Pennsylvania, USA.

6. **Haage A.,** Goodwin K., Bogutz A., Lefebvre L. & Tanentzapf G. Modulation of integrin-based cell-matrix adhesion via talin autoinhibition regulates cell behavior and migration in vivo. Gordon Research Conference: Fibronectin, Integrins & Related Molecules. February 2017. Ventura, California, USA.

5. **Haage A.,** Goodwin K., Bogutz A., Lefebvre L. & Tanentzapf G. Talin autoinhibition is important for regulating integrin-based cell-ECM adhesion in vivo. American Society for Cell Biology Annual Meeting. December 2016. San Francisco, California, USA.

4. **Haage A.** & Tanentzapf G. Talin autoinhibition in mammalian development and homeostasis. Northwest Developmental Biology Meeting. March 2016, Friday Harbor, Washington, USA.

3. **Haage A.** & Schneider I.C. Cellular contractility and ECM stiffness regulate matrix metalloproteinase activity in pancreatic cancer cells. American Society for Cell Biology Annual Meeting. December 2013. New Orleans, Louisiana, USA.

2. Zhang Y., **Riddle A.,** Whitley E.M., Schneider I.C. & Clapp A.R. Mixed-surface, lipid-tethered quantum dots for targeting cells and tissues. University of Minnesota Developmental Biology Symposium. March 2012. Minneapolis, Minnesota, USA.

1. Zhang Y., **Riddle A.,** Whitley E.M., Schneider I.C. & Clapp A.R. Mixed-surface, lipid-tethered quantum dots for targeting cells and tissues. American Society for Cell Biology Annual Meeting. December 2011. Denver, Colorado, USA.

Departmental Talks:

7. Fernandes J.D., Sarabipour S., Smith C.T., Niemi N.M., Jadavji N.M., Kozik A.J., Holehouse A.S., Pejaver V., Symmons O., Bisson Filho A.W., **Haage A.** Insights from a survey-based analysis of the academic job market. UND Biomedical Sciences Department Retreat, 2019.

6. **Haage A.,** Wagner K., Mitchell C., Goodwin K., Bogutz A., Lefebvre L., Van Raamsdonk C.D. & Tanentzapf G. Cell-ECM adhesion regulates melanoblast migration during development. UBC CELLS Program Retreat May 2019. Loon Lake, British Columbia, Canada.

5. **Haage A.,** Wagner K., Goodwin K., Mitchell C., Bogutz A., Lefebvre L., Van Raamsdonk C.D. & Tanentzapf G. What can spots tell us about animal development? UBC Post-doctoral Association Research Day. December 2018. Vancouver, British Columbia, Canada.

4. **Haage A.,** Goodwin K., Bogutz A., Lefebvre L., Plotnikov S. & Tanentzapf G. Talin autoinhibition regulates cell behavior and migration in vivo. UBC CELLS Program Retreat May 2017. Loon Lake, British Columbia, Canada.

3. **Haage A.,** Goodwin K., Bogutz A., Lefebvre L., Plotnikov S. & Tanentzapf G. Talin autoinhibition regulates cell behavior and migration in vivo. UBC Post-doc Slam January 2017. Vancouver, British Columbia, Canada.

2. **Haage A.,** Goodwin K., Webster R., Bogutz A., Lefebvre L. & Tanentzapf G. Talin autoinhibition in mammalian development and homeostasis. UBC CELLs Student-Led Seminar Series. April 2016. Vancouver, British Columbia, Canada.

1. **Haage A.** & Schneider I.C. Cellular contractility and ECM stiffness regulate matrix metalloproteinase activity in pancreatic cancer cells. UBC Cellular and Physiological Sciences Departmental Seminar Series. May 2014. Vancouver, British Columbia, Canada.

Departmental Posters:

5. **Haage A.,** Goodwin K., Whitewood A., Camp D., Bogutz A., Turner C.T., Granville D.J., Lefebvre L., Plotnikov S., Goult B.T. & Tanentzapf G. Talin autoinhibition regulates cell behavior and migration in vivo. Cellular and Physiological Sciences Research Day. January 2018. Vancouver, British Columbia, Canada.

4. **Haage A.,** Goodwin K., Bogutz A., Lefebvre L., Plotnikov S., Goult B.T. & Tanentzapf G. Talin autoinhibition regulates cell behavior and migration in vivo. Cellular and Physiological Sciences Research Day. January 2017. Vancouver, British Columbia, Canada.

3. **Haage A.,** Goodwin K., Webster R., Bogutz A., Lefebvre L. & Tanentzapf G. Talin autoinhibition in mammalian development and homeostasis UBC CELLS Program Retreat May 2016. Loon Lake, British Columbia, Canada

2. **Haage A.,** Goodwin K., Webster R., Bogutz A., Lefebvre L. & Tanentzapf G. Talin autoinhibition in mammalian development and homeostasis. Cellular and Physiological Sciences Research Day. January 2016. Vancouver, British Columbia, Canada.

1. **Haage A.,** Bogutz A., Lefebvre L. & Tanentzapf G. Talin autoinhibition in mammalian development. UBC CELLS Program Retreat May 2015. Loon Lake, British Columbia, Canada

Professional Service & Development

American Society for Cell Biology (ASCB)

- **Member** **2014 – Present**
- **Ambassador – University of British Columbia** **2017 – 2019**
- **COMPASS Member** **2017 – 2020**
- **COMPASS Communications Co-Char** **2019 – 2020**

I actively participate in the ASCB organization. I was a member of COMPASS, the ASCB Committee for Postdocs and Students. COMPASS serves as the voice for young scientists within the ASCB organization. During my time as a COMPASS member I served on two important sub-committees: 1) Outreach and 2) Communications. The outreach committee strives to involve the general public and the next generation of scientists in cell biology. To this end, they award competitive outreach grants to ASCB members all over the world to fund activities involving their local communities. I also helped organize events and initiatives to discussion science with the public and show the diverse representation of different groups in the scientific community. I also served as the communications committee co-chair. I wrote and edited pieces for the ASCB blog, called the ASCB Post (https://www.ascb.org/ascb-post/) Below you will find a list of posts I have written for this blog:

- Four ways to use social media to get people to your poster (or talk) – November 22nd, 2019
- What's it all about? Single-Cell Sequencing – August 16th, 2019
- 5 tips for surviving the academic job market – April 19th 2019
- What's it all about? 3D Bioprinting – October 26th, 2018
- Spotlight: COMPASS Outreach Grant Recipients Spring/Summer 2018 – September 14th, 2018
- preLights: Preprint highlights for biology – July 13th, 2018
- What's it all about? Microfluidics – June 15th, 2018
- Six ways to start something new in the lab – April 13th, 2018

- Lego Grad Student: Stepping one brick up in academia – March 1st, 2018
- What's it all about? Super-Resolution Microscopy – February 9th, 2018
- The Best of the ASCB Post: 2017 Edition – December 27th, 2017
- Spotlight on 2017 Fall COMPASS outreach grant recipients – December 1st, 2017
- What's it all about? Organoids – October 6th, 2017
- What's it all about? CRISPR/Cas – August 11th, 2017
- Spotlight: COMPASS Outreach Grant Recipients – June 2nd, 2017
- Keeping your enthusiasm up when science gets you down – May 5th, 2017

preLights: The Company of Biologists **2018 - Present**

I was invited to participate as a writer for a new and exciting community initiative organized by The Company of Biologists at the beginning of 2018. preLights (https://prelights.biologists.com/) launched in February 2018 as a service to highlight preprint manuscripts in biology. As a writer, I select preprints in my field on a regular basis and write summaries of their work, including commentary on how I think this work furthers the field. To date I have written 8 preLight pieces:

- A Rap1 binding stie and lipid-dependent helix in talin F1 domain cooperate in integrin activation – January 20th, 2019
- Molecular organization of integrin-based adhesion complexes in mouse embryonic stem cells & Superresolution architecture of pluripotency guarding adhesions – November 2nd, 2018
- Protein Kinase A Activity is Regulated by Actomyosin Contractility During Cell Migration and is Required for Durotaxis – September 17th, 2018
- A Transition From SoxB1 to SoxE Transcription Factors is Essential for Progression From Pluripotent Blastula Cells to Neural Crest Cells – August 2nd, 2018
- Clathrin Plaques Form Mechanotranducing Platforms – June 6th, 2018
- Spatial Self-Organization Resolves Conflict Between Individuality and Collective Migration – April 24th, 2018
- Tunable Molecular Tension Sensors Reveal Extension-Based Control of Vinculin Loading – March 4th, 2018
- GSK3 Controls Migration of the Neural Crest Lineage – January 30th, 2018

The Node: The Company of Biologists **2018**

In response to an opinion piece posted in Nature discussing the possible dangers of preprinted manuscripts in biology, several of my preLighter colleagues and I decided to pen a response. Here we highlight the potential of preprints to drive scientific understanding and innovation, while promoting the idea that preprints do not threaten good journalism, but supports it.

- Preprints Promote Transparency and Communication – August 12th, 2018

Intestinal Organoid Training Course **April 2017 – Stem Cell Technologies**

I was able to participate in a hands-on training course for the establishment of intestinal organoid cultures. The course was offered by Stem Cell Technologies, located in Vancouver, British Columbia, Canada. A description of the course can be found here: https://www.stemcell.com/products/product-types/training-and-education/intestinal-organoid-training

Canadian Journal of Undergraduate Research **2017 – 2019**

I served as a reviewer for the Canadian Journal of Undergraduate Research (http://cjur.ca/).

Iowa State University Graduate Student Organization

- **Member** **2010 – 2014**
- **Senator** **2012 – 2013**
- **President** **2013 – 2014**

I actively participated in the graduate student organization for my Ph.D major at Iowa State University. I served as our representative senator for the greater Graduate and Professional Student Senate for one year. This council presided on university wide policy that affected all graduate student programs. It also awarded competitive funding to various student groups. Under my term as Graduate Student Organization president I initiated several new programs including a monthly interdisciplinary journal club, a family-orientated science night held at a local elementary school, and an interdisciplinary poster competition. Since my Ph.D major was very interdisciplinary and spread-out across the entire campus, my goal as president was to bring a sense of cohesion to our group and get more graduate students talking to each other.

BioRxiv Affiliate **2020 - Present**

I was invited to participate as a bioRxiv affiliate in late 2019, starting in 2020. BioRxiv Affiliates are members of the scientific community who provide feedback on the service, act as advocates, and help in screening material submitted. https://www.biorxiv.org/about-biorxiv

HAPS Social Media Team **2020 - Present**

I was invited to participate as a member of the newly formed social media team for the Human Anatomy and Physiology Society (HAPS) in April 2020. I primarily run the twitter account for this organization (@HumanAandPSoc). I also participate in discussions on how to bolster membership interaction via social media.

University Service & Development

Alice T. Clark Faculty Mentoring Program **2019 - Present**

I chose to participate in this program that provides orientation and collegial support to first year faculty. The program consists of monthly meetings, as well as year-long one-on-one mentorship. I have successfully completed my first year and will continue with this program through next year.

UND workshops attended – Acclaim Profile

- TTADA Inclusive Excellence Book Read 2020
- TTADA Universal Design Book Read 2020
- SMHS Education Resources Book Read 2020
- Having Difficult Conversations 2020
- Developing Your Voice to Advocate for Others 2020
- Pronouns & Gender for Academic Writing 2020
- SMHS Education Resources Book Read 2019
- SMHS Educator Scholar Sessions 2019 - Present

- Implementing High Impact Practices Across Modalities 2019
- Qualtrics Creating Surveys Introduction 2019
- New Faculty Orientation 2019

UND Committee Participation

- Pre-Optometry Club Advisor
- BIMD Undergraduate Education Committee Volunteer
- Medical Curriculum: Integrating Basic Science Volunteer
- Medical Curriculum: Medicine in Society Volunteer
- Medical Curriculum: Hearts & Lung Volunteer
- Biomedical & Health Sciences Curriculum Committee Elected