

Elisabeth M. Simonin, Ph.D.

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EDUCATION

- Ph.D.** Immunology and Infectious Diseases December 2021
College of Veterinary Medicine, Cornell University, Ithaca, NY
- B.S.** Biology major, Chemistry minor May 2016
Magna Cum Laude
Whitworth University, Spokane, WA

HONORS AND AWARDS

- 2024 Flash Talk First Place Award
Boston Children's Hospital Postdoctoral Association Symposium
- 2024 AAAAI Postdoc Travel Grant
AAAAI Annual Meeting
- 2024 EAACI Travel Grant
EAACI Annual Winter School
- 2021 Top Read Research Article
The Journal of Immunology
- 2019, 2021 AAVI/AAI Young Investigator Award
Conference for Researchers and Workers in Animal Diseases
- 2019, 2021 Student Travel Award
Conference for Researchers and Workers in Animal Diseases
- 2018 Best Poster Presentation
Cornell Biomedical and Biological Sciences Symposium
- 2016 Outstanding Graduating Biology Student Award
Whitworth University
- 2015 Senior Biology Departmental Scholarship
Whitworth University
- 2012-2016 Mind and Heart Academic Scholarship
Whitworth University
- 2012-2016 Washington State Opportunity Scholarship

TEACHING EXPERIENCE

Simmons University **Boston, MA**
Assistant Teaching Professor 2024-present
School of Sciences and Health Professions, Department of Biology
I teach Principles of Microbiology (BIOL 123N, 4 credits) which is part of the undergraduate Simmons Nursing Program and Microbiology (BIOL 221, 4 credits) which is a biology elective course and pre-health prerequisite course. I am responsible for course design and am the primary instructor for the lecture portion of the course. Both courses have weekly lab sections and I teach some of the sections.

Harvard University **Boston, MA**
Research Mentor 2023-2024
Nadeau Research Lab

One-on-one training of undergraduate and post-baccalaureate students during 8-12 week internships. The techniques taught include: pipetting, sterile practice, maintaining a lab notebook, literature review, R programming, data analysis and presentation. These students are co-authors with me on two upcoming review articles/chapters and one will be a co-author in an upcoming manuscript. The internships covered the following research projects:

1. *Differential methylation patterns between mother and child in the context of air pollution exposure*
2. *The benefits of a life course epidemiologic approach when addressing the health impacts of climate change*

Cornell University
Research Mentor

Ithaca, NY
2018-2022

Wagner Equine Immunology Lab

One-on-one training of undergraduate and veterinary students during six different 12-week internships. The lab techniques taught include: pipetting, sterile practice, maintaining a lab notebook, PCR, bacterial cloning, gel electrophoresis, gene alignment analysis, flow cytometry, bead-based assay, literature review, data analysis and presentation. One of these projects was part of a publication and the student was a co-author. The internships covered the following research projects:

3. *Recombinant equine IL-8 production for monoclonal antibody development*
4. *CD23 isoforms in equine *Culicoides* hypersensitivity*
5. *Reviewing the history of *Culicoides* hypersensitivity*
6. *Comparing genetic and environmental causes of allergy*
7. *Developing assays to monitor the activation status of monocytes in equine allergy*
8. *B cell proliferation in equine neonates*

Teaching Assistant

2019

BIOMG 1350 Principles of Cell and Developmental Biology

Taught weekly active learning sections (3 classes of 20 students) for an undergraduate course covering the following topics: microscopy, molecular motors, membrane transport, protein sorting and secretion, PYMOL, model organisms, cell fate determination, cell signaling, and differential adhesion.

Whitworth University

Spokane, WA

Teaching Assistant

2013-2015

BI 140 General Biology I: Genes, Cells and Evolution Lab

BI 141 General Biology II: Plant Biology Lab

BI 230 Introduction to Biochemistry

BI 363 Genetics

Assisted instruction of 2 undergraduate labs (15 students each) and 2 undergraduate courses (20-40 students) by tutoring students weekly, grading tests and daily quizzes/homework and leading review sessions. Taught and prepared laboratory course skills and materials including: safety training, gel electrophoresis, spectrophotometry, centrifugation, preparation and maintenance of homozygote *Drosophila* colonies.

TEACHING OUTREACH

Elementary School Outreach

Spring 2018-2019

Cayuga Heights Elementary School

Taught an annual interactive workshop for 4th graders on taste/smell sensation and transmission to the brain.

Fall Creek and South Hill Elementary Schools

Designed and taught an annual 4-lesson interactive workshop for 2nd-4th graders on the immune system and staying healthy.

Expanding Your Horizons Workshop

April 2019

Cornell University

Designed and taught an interactive workshop for middle school girls on DNA mutations, protein translation and the role of chaperone proteins.

TEACHING TRAINING

Summer Teaching Institute

August 2024

Simmons University Center for Faculty Excellence and Harvard Medical School Postdoctoral Association

Participated in a one week in-person intensive teaching institute. This course taught pedagogical practices of undergraduate STEM teaching including models grounded in cognitive science, active learning, and humanizing, engaging, democratizing and inclusive teaching. The course also highlighted how to promote diversity, equity, inclusion, justice and belonging into the classroom, and how to apply backward course design to lesson development.

Teaching Inclusively Online Workshop

December 2017

Center for the Integration of Research, Teaching and Learning, Cornell University

Participated in an online workshop on inclusive teaching techniques. Workshop used role-play activities to practice how to respond to hypothetical diversity-related conflicts/topics in the classroom.

Introduction to Teaching Undergraduate STEM Courses

2017

Took a 6-week online open access MOOC course and participated in weekly in-person local learning community meetings at Cornell University.

RESEARCH EXPERIENCE

Harvard University, T.H. Chan School of Public Health

Boston, MA

Postdoctoral Research Fellow

April 2023-July 2024

Epigenetic Inheritance of Immune Regulation in the Context of Climate Change and Allergy

Advisor: Dr. Kari C. Nadeau, MD, PhD

- EpiTOF (Epigenetic Landscape Profiling by Time-Of-Flight mass cytometry), experimental design, execution and data analysis
- Data analysis via RStudio
- Supervised and trained five student research interns
- Managed human sample biobank and sample selection
- Establishment of new research lab space and machine acquisition

Associations between infantile colic and biomarkers in a Longitudinal Birth Cohort

Advisor: Dr. Kari C. Nadeau, MD, PhD

- Model algorithms to analyze large data sets
- Collaboration with birth cohort study team

Cornell University, College of Veterinary Medicine

Ithaca, NY

Postdoctoral Research Associate

January 2022-March 2023

Developing therapeutics to treat equine allergy

Advisor: Dr. Bettina Wagner, DVM, Dr. vet. med. habil

- Conceptualized experiments and developed timeline and budget
- Conducted experiments, produced treatments for clinical trial, and analyzed data
- Co-led presentations in weekly meetings with collaborating pharmaceutical company
- Collaborated with scientists across different disciplines (research associates, clinicians, program directors,

- clinical safety officers)
- Wrote and received approval for IACUC Amendment
- Supervised and trained two students, collaborated with research associate

Dissertation Research / Graduate Research Assistant

2016-2021

IgE+ plasmablasts in the mechanism of equine allergy

Advisor: Dr. Bettina Wagner, DVM, Dr. vet. med. habil

- Conceptualized led, and managed entire research program including experimental design, analysis, presentation, and application
- Collaborated with project teams across different disciplines (biomedical researchers, diagnostic labs, technology licensing lawyers, client horse owners)
- Developed and validated new research tools, SOPs, and an allergy biomarker diagnostic assay
- Met with clients (horse owners) to discuss involvement in research project
- Supervised and trained three veterinary students, collaborated with research associate
- Wrote project proposals and established project deliverables for diagnostic assay development
- Presented results at seminars, invention disclosure meetings, and conferences
- Primary author for two research articles (one is in the final editing stage).
- Primary author of a research grant proposal to fund new diagnostic assay development

IgE+ monocytes in the mechanism of equine allergy

Advisor: Dr. Bettina Wagner, DVM, Dr. vet. med. habil

- Created and validated new research tools (monoclonal antibody and flow cytometry panel)
- Designed an analysis plan including data collection and management
- Developed project plan, budget and deliverables to best use time and resources
- Supervised and trained two undergraduate students
- Collaborated with scientists across different disciplines (pathology, molecular diagnostics, genomics, imaging, instrument core facilities)
- Presented results at symposiums, seminars and conferences
- Wrote multiple project grant proposals
- Primary author of two published research articles and one published review article

Rotating Graduate Student

2016-2017

Characterization of allergen-specific plasma cells in the bone marrow of Icelandic horses

Advisor: Dr. Bettina Wagner, DVM, Dr. vet. med. habil

Changes in ROR γ T⁺ cells in gut during food allergy

Type 2 Innate Lymphoid Cell integrin expression in lung during Type 2 inflammation

Advisor: Dr. Elia Tait Wojno, PhD

Recycling endosome trafficking of BI integrins in RBL mast cells

Advisors: Drs. David Holowka, PhD and Barbara Baird, PhD

- Formulated project work plans and generated data reports
- Communicated key results to colleagues
- Presented results at team meetings and seminars
- Contributing author of one published research article

National Institutes of Health (NIAID), Lab of Allergic Disease

Bethesda, MD

Summer Research Intern

2015

Influence of sphingosine-1-phosphate on the biological function of mast cells through the SIP4 receptor

Advisors: Drs. Dean Metcalf, MD, Ana Olivera, PhD, and Joseph Kulinski, PhD

- Collaborated alongside different medical teams (research scientists and medical doctors)
- Generated data reports, practiced problem-solving, data analysis and interpretation
- Presented results at team meetings
- Contributing author of one published research article

Whitworth University

Spokane, WA

Undergraduate Research Assistant

2014-2016

Development of dementia and cancer therapeutics from angiotensin IV modification

Advisor: Dr. Michael Sardinia, DVM, PhD

- Formulated project work plans and generated data reports
- Communicated key results to colleagues
- Presented results at an undergraduate research conference

Undergraduate Lab Research Projects

2014-2015

Genetic relationship between lobe and bar genes in Drosophila

Advisor: Dr. Lee Anne Cheney, PhD

Course: BI 363 Genetics Lab

The effect of various concentrations of yeast extract as a nitrogen source on the growth and metabolism of Staphylococcus spp.

Advisor: Dr. Frank Caccavo, PhD

Course: BI 447 Microbial Physiology Lab

The effects of a Mindfulness-Based Stress Reduction Meditation regimen on the physiological stress response in college students

Advisor: Dr. Michael Sardinia, DVM, PhD

Course: BI 323 Animal Physiology Lab

- Formulated project work plans, generated data reports and communicated key results to colleagues
- Presented results to classmates and professors in both written and oral formats
- Wrote and received IRB approval

PUBLICATIONS

Last name changed to Simonin from Larson in 2022

Complete list of published work under ORCID: 0000-0001-9195-5061

Journal Articles

Simonin EM, Wagner B. IgE-binding monocytes upregulate the coagulation cascade in allergic horses. *Genes & Immunity*. 2023;1-9. doi.org/10.1038/s41435-023-00207-w

Simonin EM, Babasyan S, Tarsillo J, Wagner B. IgE+ plasmablasts predict the onset of clinical allergy. *Front Immunol*. 2023;14:1104609. doi:10.3389/fimmu.2023.1104609

Simonin EM, Babasyan S, Wagner B. Peripheral CD23hi/IgE+ plasmablasts secrete IgE and correlate with allergic disease severity. *J Immunol*. 2022;209(4):665-674. doi.org/10.4049/jimmunol.2101081

Guarino C, **Larson EM**, Babasyan S, Rollins A, Joshi LR, Laverack M, et al. Development of a quantitative COVID-19 multiplex assay and its use for serological surveillance in a low SARS-CoV-2 incidence community. *PLoS ONE*. 2022;17(1):e0262868. doi.org/10.1371/journal.pone.0262868

Schnabel, CL, Babasyan, S, Freer, H, **Larson, EM**, Wagner, B. New mAbs facilitate quantification of secreted equine TNF- α and flow cytometric analysis in monocytes and T cells. *Vet Immunol Immunopathol*. 2021;110284. doi.org/10.1016/j.vetimm.2021.110284

- Raza F, Babasyan S, **Larson EM**, Freer HS, Schnabel CL, Wagner B. Peripheral blood basophils are the main source for early interleukin-4 secretion upon in vitro stimulation with *Culicoides* allergen in allergic horses. *PLoS ONE*. 2021;16:e0252243. doi.org/10.1371/journal.pone.0252243
- Larson, EM**, Wagner, B. Viral infection and allergy – What equine immune responses can tell us about disease severity and protection. *Molec Immunol*. 2021;135:329–341. doi.org/10.1016/j.molimm.2021.04.013
- Larson EM**, Babasyan S, Wagner B. IgE-binding monocytes have an enhanced ability to produce IL-8 (CXCL8) in animals with naturally occurring allergy. *J Immunol*. 2021;206:2312-2321. doi:10.4049/jimmunol.2001354
- Larson EM**, Babasyan S, Wagner B. Phenotype and function of IgE-binding monocytes in equine *Culicoides* hypersensitivity. *PLoS ONE*. 2020;15:e0233537. doi:10.1371/journal.pone.0233537.
- Oyesola OO, Duque C, Huang LC, **Larson EM**, Früh SP, Webb LM, Peng SA, Tait Wojno ED. The prostaglandin D2 receptor CRTH2 promotes IL-33-induced ILC2 accumulation in the lung. *J Immunol*. 2020;204(4):1001-1011. doi: 10.4049/jimmunol.1900745
- Kulinski JM, Proia RL, **Larson EM**, Olivera A. S1P 4 Regulates Passive Systemic Anaphylaxis in Mice but Is Dispensable for Canonical IgE-Mediated Responses in Mast Cells. *Int J Mol Sci*. 2018;19(1279):1-15. doi:10.3390/ijms19051279.

Textbook Chapters

- Wagner B, Schnabel CL, **Simonin EM**, Holmes CM. The Immune System of Horses and Other Equids, in Encyclopedia of Immunobiology, 2nd edn. 2024. In Press. doi:10.1016/B978-0-128-24465-4.00015-6.

PRESENTATIONS AND INVITED LECTURES

Oral Presentations

- “Epigenetic mechanisms of allergic diseases during pregnancy.” Mechanisms of Environmental and Lung Diseases, Harvard School of Public Health, Department of Environmental Health, Boston, MA, April 2024.
- “Epigenetic mechanisms of allergic diseases during pregnancy.” Boston Children’s Hospital Postdoc Symposium Flash Talks, Boston, MA, February 2024.
- “Epigenetic mechanisms of allergic diseases during pregnancy.” European Academy of Allergy and Clinical Immunology, Zakopane, Poland, January 2024.
- “Peripheral IgE+ plasmablasts secrete IgE and correlate to allergic disease severity,” Conference for Researchers and Workers in Animal Diseases, Chicago, Illinois, December 2021.
- “IgE-binding monocytes promote allergic inflammation through IL-8 production,” Conference for Researchers and Workers in Animal Diseases, Chicago, Illinois, December 2021.
- “IgE+ monocytes and basophils in the mechanism of equine allergy,” Ph.D. Thesis Seminar. Cornell University, Ithaca, NY, October 2021.
- “IL-8 production by IgE-binding monocytes in equine allergy,” Biomedical and Biological Recruitment Event, Cornell University, Ithaca, NY January 2021.
- “IgE-binding Monocytes have an enhanced ability to produce IL-8 (CXCL8) in equine allergy,” Conference for Researchers and Workers in Animal Diseases, virtual, December 2020.
- “Peripheral IgE+ B cells in allergic horses,” Work in Progress Seminar, Biomedical and Biological Science Program, Cornell University, Ithaca, NY, September 2020.
- “IgE-binding Monocytes in equine seasonal *Culicoides* hypersensitivity,” Conference for Researchers and Workers in Animal Diseases, Chicago, Illinois, November 2019.
- “IL-8 production by IgE-binding cells in allergic Icelandic horses,” Work in Progress Seminar, Biomedical and Biological Science Program, Cornell University, Ithaca, NY, October 2019.
- “IgE Binding Monocytes as a Predictive Biomarker of Equine Allergy,” Work in Progress Seminar, Biomedical and Biological Science Program, Cornell University, Ithaca, NY, December 2018.

“Characterizing surface markers of IgE-binding antigen presenting cells in allergic Icelandic horses,” Work in Progress Seminar, Biomedical and Biological Science Program, Cornell University, Ithaca, NY, March 2018.

“Identification of Allergen-Specific Plasma Cells in Icelandic Horses,” Work in Progress Seminar, Biomedical and Biological Science Program, Cornell University, Ithaca, NY, November 2016.

“Influence of Sphingosine-1-phosphate Receptor 4 on Mast Cell Responses,” Mast Cell Biology Laboratory Meeting, Laboratory of Allergic Disease, National Institutes of Health, Bethesda, MD, July 2015.

Poster Presentations

“Epigenetic mechanisms of allergic diseases during pregnancy.” American Association of Asthma, Allergic and Clinical Immunology Annual Meeting, Washington, D.C., February 2024.

“Epigenetic mechanisms of allergic diseases during pregnancy.” Asthma and Allergic Disease Clinical Research Centers Annual Meeting, NIAID, NIH, Rockville, MD, October 2023.

“IgE+ plasmablasts express high CD23 and circulate following allergen exposure,” AAI annual conference, Portland, OR, May 2022

“IgE+ plasmablasts express high CD23 and circulate following allergen exposure,” Cornell University Intercampus Immunology Symposium, New York, NY, April 2022

“Phenotyping IgE+ Monocytes in Allergic Icelandic Horses,” Biomedical and Biological Recruitment Event, Cornell University, Ithaca, NY, February 2018, 2019, 2020.

“IgE-binding Monocytes in equine seasonal *Culicoides* hypersensitivity,” Zweig Memorial Fund Meeting, Cornell University, Ithaca, NY, November 2018, 2019.

“Phenotyping IgE+ Monocytes in Allergic Icelandic Horses,” Upstate New York Immunology Conference, Cooperstown, NY, October 2018.

“The effects of a Mindfulness-Based Stress Reduction Meditation regimen on the physiological stress response of college students,” Spokane Intercollegiate Research Conference, Whitworth University, Spokane, WA, April 2016.

PATENTS / INVENTION DISCLOSURES

Patent Application

“IgE+ plasmablasts as a predictive biomarker of allergy”

October 2022

Disclosure of invention is in place with the Center for Technology Licensing at Cornell University.

PROFESSIONAL AFFILIATIONS

European Academy of Allergy and Clinical Immunology (EAACI)

2023-Present

Federation of Clinical Immunology Societies (FOCiS)

2023-Present

American Academy of Allergy, Asthma and Immunology (AAAAI)

2021-Present

American Association of Immunologists (AAI)

2021-Present

American Association of Veterinary Immunologists (AAVI)

2019-Present

PROFESSIONAL SERVICE

Journal Club Administrator

2023-2024

Harvard School of Public Health, Department of Environmental Health

I co-founded and organize a biweekly department-wide journal club for students to study current methods in the field of environmental health.

Immunology Consultant

2024

Alpina Biotechnology

Editorial Consultant Board Member
The Equine Veterinary Journal

2022-2024

Article Reviewer

2018-Present

Allergy; Clinical Epigenetics; The Equine Veterinary Journal; The Journal of Allergy and; Clinical Immunology; PLoS One; Science of the Total Environment; The Veterinary Journal