

Michelle Serge Swarovski

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Residence: Salt Lake City, 84130

A. Education:

08/2021 – Present University of Utah

2nd year Neuroscience PhD Student

09/2013 – 08/2017 *University of California, Davis*

B.S. in Cognitive Science, Neuroscience emphasis

B. Research Experience:

08/2018 – 08/2021 *Andreasson Lab at the Department of Neurology & Neurological Sciences, Stanford University School of Medicine*

Life Science Research Professional I (LSRPI)

Research in the lab focuses on the role of innate immune cell responses in both chronic and acute models of neurodegenerative disease and the potential clinical translation.

- Performed buffy coat isolation of monocytes and differentiation into microglia-like cells.
- Performed metabolic analysis on human MDMi cells and C57BL/6J peritoneal macrophages with the Seahorse XF Cell Mito Stress Test.
- Performed crystallography experiments in a small molecule discovery program.
- Performed sample handling and biomarker ECLIA analysis on CSF and plasma from Alzheimer's Disease, Parkinson's Disease, Multiple Sclerosis and stroke patients.
- Performed IHC, ICC, and flow cytometry experiments investigating an exploratory biomarker of the maladaptive immune response.

01/2018 – 08/2018 *Andreasson Lab at the Department of Neurology & Neurological Sciences, Stanford University School of Medicine*

Lab Technician

- Assisted in a number of projects in the lab that look into immune cell markers and their role in neurodegenerative diseases.
- Maintained detailed records of experiments and outcomes.
- Presented a data presentation to summarize the findings from crystallography experiments in a small molecule discovery program and multiple journal clubs.

01/2017 – 06/2017 *Integrated Attention Lab at the Center for Mind and Brain, UC Davis*

Research Assistant and

06/2017 – 08/2017 **National Science Foundation Research Experiences for Undergraduates**

(REU) Supplement Fellowship at the Integrated Attention Lab, UC Davis

Research in the lab focuses on how behavioral goals and prior experiences interact with sensory events to determine perception and cognition.

- Administered computer behavioral assessments and eye tracking for a project that examines both the behavioral aspects (visual search task/identification task) and brain mechanisms (fMRI) involved with how the information of the attentional template is flexibly adjusted to optimize visual performance.

06/2016 – 09/2016 *Gilead Sciences, Discovery Pathology*

Summer Intern

Gilead Sciences is a research-based biopharmaceutical company focused on the discovery, development, and commercialization of innovative medicines.

- Developed and optimized immunohistochemistry assays with various types of detection for the profiling of specific immune cells.
- Obtained skills in histotechnology such as fixing, processing, embedding, and sectioning of human, mouse, rat, woodchuck and cynomolgus monkey tissues.

10/2015 – 06/2017 *Karen Bales Laboratory for Comparative Neurobiology of Monogamy, UC Davis*

Research Assistant

Research in the lab examines the endocrinology and neurobiology of social bonding.

- Investigated effects of oxytocin and vasopressin on the social bonding of the monogamous species of Prairie Voles (*Microtus ochrogaster*).
- Completed scoring of behavioral videos dealing with alloparental behavior in Prairie Voles.
- Assisted in study on effects of intranasal administration of oxytocin on weight loss in diet-induced obese Prairie Voles.

04/2017 – 09/2017 *Dynamic Memory Lab at the Center for Neuroscience*

Research Assistant

Research in the lab focuses on how retrieval and reactivation shape memory and the role that contextual features play in shaping this process.

- Identified the anatomical markers of the entorhinal cortex, and the perirhinal cortex in MRI images to contribute to the production of 3D volumes of the hippocampus and other medial temporal lobe structures.

B. Leadership and Work Experience:

09/2022 – Present **Brain Awareness Week Co-Chair**

08/2022 – Present **Founder and President of Crash Course in Neuroscience Journal Club**

02/2022 – Present **Snowbird Symposium Co-Chair**

07/2019 – 08/2019 **Instructor** for the intensive two-week, Stanford Summer Science Internship

Program (SSSIP). Oversaw a group of high school students through nine hands-on experiments to test mutant tau's effect on microtubule organization and cell viability.

06/2018 – 06/2019 **Co-mentored a Stanford senior biology honors thesis project:** “TREM1 and TREM2 in the Maladaptive Immune Response in Alzheimer’s Disease”

10/2016 – 06/2017 **Member** of the Cognitive Science Club at UC Davis

09/2015 – 09/2016 **Co-race director** for the UCD Aggieathlon, UC Davis Triathlon Team

09/2014 – 06/2016 **Group Cycling Instructor** UC Davis Activities and Recreation Center

D. Training and Certification:

03/2018 – Present 1) Certified User for Flow Cytometry and FACS at Stanford Shared FACS Facility

04/2018 – 09/2018 2) Certified User of Stanford Light Source Synchrotron at SLAC National Accelerator Center

01/2019 – Present 3) Certified User of Fujirebio Inc. Lumipulse G1200

08/2020 – Present 4) Trained for the use of the LSM 710 laser scanning confocal microscope by the Stanford Neuroscience Microscopy Service

E. Laboratory Skills:

Cell Culture	<ul style="list-style-type: none"> > Isolation of peripheral blood mononuclear cells and monocytes from human blood > Differentiation of monocytes into microglia-like cells (MDMi) > Isolation of peritoneal macrophages from C57BL/6J mice > Cell reporter lines (NFAT)
Animal Work	<ul style="list-style-type: none"> > Animal care and husbandry > Handling > Drug administration > Kidney, spleen, liver, small and large intestine organ collection from C57BL/6J mice
Immunohistochemistry	<ul style="list-style-type: none"> > Sectioning of mouse brain and spinal cord > Immunostaining of macrophages (Iba1), microglia (Iba1, P2RY12, TMEM119), neurons (NeuN), microtubules (α-tubulin), Aβ plaques (6e10), glutamatergic synaptic islands (PSD95 and VGLUT2), myelin (MBP), activated microglia (CD68), T-Cells (CD3) > Use of PFA fixed and FFPE tissues > Light and fluorescent microscopy
Flow Cytometry	<ul style="list-style-type: none"> > Preparation, treatment, staining, and flow cytometry analysis: human monocyte derived macrophages (MDMs), human monocyte derived microglia-like cells (MDMi), and peritoneal macrophages from C57BL/6J mice
Molecular Biology	<ul style="list-style-type: none"> > Plasmid isolation > Transfection of HEK and COS7 cells > Restriction enzyme digest > PCR
Biochemistry	<ul style="list-style-type: none"> > Bicinchoninic acid assay (BCA) > Western blot > Seahorse Assay for mitochondrial respiration > Electrochemiluminescence (ECLIA) and ELISA
Structural Biology	<ul style="list-style-type: none"> > Protein crystal production for X-ray crystallography
Statistics	<ul style="list-style-type: none"> > R Studio > GraphPad Prism 8 > ImageStudioLite > Fiji image processing package > FlowJo

F. Publications:

Peer-Reviewed Publications

- 1) **Peripheral TREM1 responses to brain and intestinal immunogens amplify stroke severity.** Qingkun Liu, Emily M. Johnson, Rachel K. Lam, Qian Wang, Hong Bo Ye, Edward N. Wilson, Paras S. Minhas, Ling Liu, **Michelle S. Swarovski**, Stephanie Tran, Jing Wang, Swapnil S. Mehta, Xi Yang, Joshua D. Rabinowitz, Samuel S. Yang, Mehrdad Shamloo, Christoph Mueller, Michelle L. James, and Katrin I. Andreasson. **Nature Immunology**. 20: 1023-1034 (2019).

For this contribution I was involved in collecting, culturing, and stimulating peritoneal macrophages for targeted metabolomics analysis.

- 2) **Soluble TREM2 is elevated in Parkinson's disease subgroups with increased CSF tau.** Edward N. Wilson, **Michelle S. Swarovski**, Patricia Linortner, Marian Shahid, Abigail J. Zuckerman, Qian Wang, Divya Channappa, Paras S. Minhas, Siddhita D. Mhatre, Edward D. Plowey, Joseph F. Quinn, Cyrus P. Zabetian, Lu Tian, Frank M. Longo, Brenna Cholerton, Thomas J. Montine, Kathleen L. Poston, Katrin I. Andreasson. **Brain**. 143: 932-943 (2020).

For this contribution, I aided in the preparation, ECLIA measurement, and analysis of patient CSF and plasma samples. In addition, I was responsible for maintaining inventory of supplies and was solely responsible for weekly maintenance of specialized equipment.

- 3) **Association of CSF biomarkers with hippocampal-dependent memory in preclinical Alzheimer disease.** Alexandra N Trelle, Valerie A Carr, Edward N Wilson, **Michelle S Swarovski**, Madison P Hunt, Tyler N Toueg, Tammy T Tran, Divya Channappa, Nicole K Corso, Monica K Thieu, Manasi Jayakumar, Ayesha Nadiadwala, Wanxia Guo, Natalie J Tanner, Jeffrey D Bernstein, Celia P Litovsky, Scott A Guerin, Anna M Khazenzon, Marc B Harrison, Brian K Rutt, Gayle K Deutsch, Frederick T Chin, Guido A Davidzon , Jacob N Hall, Sharon J Sha, Carolyn A Fredericks, Katrin I Andreasson, Geoffrey A Kerchner, Anthony D Wagner , and Elizabeth C Mormino. **Neurology**. 96(10):e1470-e1481.(2021).

For this contribution, I aided in the preparation, analysis of patient CSF samples. In addition, I was responsible for maintaining inventory of supplies and was solely responsible for weekly maintenance of specialized equipment.

- 4) **Plasma Biomarkers of Tau and Neurodegeneration During Major Cardiac and Noncardiac Surgery.** Igor Feinstein, Edward N. Wilson, **Michelle S. Swarovski**, Katrin I. Andreasson, Martin S. Angst, and Michael D. Greicius. **JAMA Neurology**. 78(11):1407-

Manuscripts Deposited on Preprint Server

- 1) **CSF sTREM2 correlates with CSF tau in advancing Parkinson's disease.** Edward N. Wilson, **Michelle S. Swarovski**, Patricia Linortner, Marian Shahid, Abigail J. Zuckerman, Qian Wang, Divya Channappa, Paras S. Minhas, Siddhita D. Mhatre, Edward D. Plowey, Joseph F. Quinn, Cyrus P. Zabetian, Lu Tian, Frank M. Longo, Brenna Cholerton, Thomas J. Montine, Kathleen L. Poston, Katrin I. Andreasson. **bioRxiv**.687269;doi:<https://doi.org/10.1101/687269>(2019).

Manuscripts Currently in Preparation

- 1) **TREM1 disrupts myeloid bioenergetics in models of aging and Alzheimer's disease.** Edward N. Wilson, **Michelle S. Swarovski**, Aisling Chaney, Kristy A. Zera, Esha Gauba, Paras S. Minhas, Qian Wang, Haley Cropper, Poorva Jain, Abigail J. Zuckerman, Swapnil S. Mehta, Connie Tsai, Siddhita D. Mahtre, Anna Janas, Christoph G. Mueller, Thomas J. Montine, Marion Buckwalter, Michelle L. James, Katrin I. Andreasson, and the AZSAND. (Submitted to **Nature Ref: 2022-10-15945**).

For this manuscript, I have been responsible for modeling the *in vitro* TREM1-mediated metabolic, inflammatory, and cellular responses to immune stimulation using human monocyte-derived microglia-like (MDMi) cells. In addition, I have been aiding in assessing the effects of TREM1-deletion *in vivo* in aged and Alzheimer's disease mouse models.

- 2) **Kynurenine Pathway Activation as a Potential Biomarker in Alzheimer's and Parkinson's Disease.** Paras S. Minhas, Edward N. Wilson, **Michelle S. Swarovski**, Divya Channappa, Frank M. Longo, Cyrus P. Zabetian, Lu Tian, Thomas J. Montine, Kathleen L. Poston, and Katrin I. Andreasson

For this manuscript, I aided in the collection of patient cerebrospinal fluid and blood samples and their preparation for Mass Spectrometry analysis. In addition, I was responsible for measuring cerebrospinal fluid levels of Alzheimer's disease biomarkers tau and amyloid beta using the advanced Lumipulse platform from Fujirebio on which I am a certified operator.

G. Oral Presentation:

- 1) **Michelle S. Swarovski**, Edward N. Wilson, Qian Wang, Geidy E. Serrano, Thomas G. Beach and Katrin I. Andreasson. **TREM2 Protein in Frontal Cortex Associates with**

Amyloid, Tau, and Vascular Neurodegenerative Pathologies in Alzheimer's Disease.

Advances in Alzheimer's and Parkinson's Therapies An AAT-AD/PD Focus Meeting, Vienna, Austria, April, 2-5 2020 (Virtual Conference).

H. Poster Presentation:

- 1) **Michelle S. Swarovski**, Dani Lemmon, Nika Romero, Michael Conoscenti, Stefano Brigidi, Moriel Zelikowsky. **CA1 Molecular Signatures Underlying Context Fear and Fear Renewal After Extinction.**
Poster presented at: Pavlovian Society Annual Meeting, 2022, Saint Kate Hotel, Milwaukee, WI on September 29 – October 1, 2022.
- 2) **Michelle S. Swarovski**, Xinger Yu, Joy J. Geng. **Behavioral Study of Attentional Control that Supports Flexible Template Adjustment.**
Poster presented at: 28th Annual Undergraduate Research Conference, University of California, Davis on April 28th, 2017.
- 3) **Michelle Swarovski**, Igor Mikalian, David Newstrom, Vivian Berry, Robert Brockett. **Duplex Tissue Immunoprofiling for Macrophages and T Cells.**
Poster presented at: Summer Intern Session, Department of BCS-Pathology, Gilead Sciences, Inc. on August 09, 2016.

I. Conference Research Abstracts:

AD/PD 2021

Measurement of plasma and serum P-Tau181 in Alzheimer's Disease using the fully-automated Lumipulse G platform: a Feasibility Study. Edward N. Wilson, **Michelle S. Swarovski**, Jacob N. Hall, Nathalie Le Bastard, Victor W. Henderson, Frank M. Longo, Joseph P. Quinn, and Katrin I. Andreasson.

AAT AD/PD 2020

TREM2 Protein in Frontal Cortex Associates with Amyloid, Tau, and Vascular Neurodegenerative Pathologies in Alzheimer's Disease.

Michelle S. Swarovski, Edward N. Wilson, Qian Wang, Geidy E. Serrano, Thomas G. Beach and Katrin I. Andreasson.

AAT AD/PD 2020

Defining Metabolic Biomarker Signatures in Parkinson's Disease CSF and Plasma.

Edward N. Wilson, **Michelle S. Swarovski**, Øivind Midttun, Paras S. Minhas, Marian Shahid, Divya Channappa, Qian Wang, Siddhita Mhatre, Edward D. Plowey, Lu Tian, Frank M. Longo, Geoffrey A. Kerchner, Brenna Cholerton, Cyrus P. Zabetian, Joseph F. Quinn, Daniel

Weintraub, Alice Chen-Plotkin, Thomas J. Montine, Anthony D. Wagner, Elizabeth C. Mormino, Kathleen L. Poston, and Katrin I. Andreasson.

SNMMI 2020

TREM1-PET imaging of pro-inflammatory myeloid cells distinguishes active disease from remission in Multiple Sclerosis. Aisling M. Chaney, Edward N. Wilson, Poorva Jain, Haley C. Cropper, **Michelle S. Swarovski**, Katherine Lucot, Hannes Vogel, Katrin I. Andreasson, Michelle L. James.

AD/PD 2019

TREM2 is a Novel CSF Biomarker of Cognitive Decline in Parkinson's Disease. Edward N. Wilson, Patricia Linortner, **Michelle S. Swarovski**, Divya Channappa, Paras S. Minhas, Geoffrey Kerchner, Edward D. Plowey, Frank M. Longo, Tony Wyss-Coray, Cyrus P. Zabetian, Thomas J. Montine, Kathleen L. Poston, and Katrin Andreasson.

Undergraduate Research Conference, UC Davis 2017

Behavioral Study of Attentional Control that Supports Flexible Template Adjustment. **Michelle S. Swarovski**, Xinger Yu, Joy J. Geng.

J. Hobbies and Extracurricular:

- UC Davis Triathlon Club Member, September 2013- June 2017: Participated in the 2014, 2015, 2016 and 2017 Collegiate Club National Championships
- Coeur d'Alene Ironman Triathlon, June 2013 Finisher, 8th Place in the 18-24 Age Division
- Long Course Triathlon Age Group World Championships, August 2013, 5th Place in the 18-19 Age Division

K. Additional Coursework:

UC Berkeley Extension: Immunology X110 – June 9th – July 28th 2020

Stanford Continuing Studies Program: WSP 198 An Introduction to Neurological Disorders: ALS, Epilepsy, Stroke and More – June 1st – 2nd 2019

