

Aaron C. Kelley

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EDUCATION

- National Autonomous University of Mexico (UNAM) | Graduation: June 2022
 - Master's in **Mathematics**
 - **Thesis (2022)**: Describing the topological collapse of mutualistic ecological systems via coexistence holes
- University of Michigan (Ann Arbor) | Graduation: May 2019
 - Bachelor of Science in **Biochemistry and Math**
 - **Thesis (2019)**: Crystal structure of a periplasmic activator of peptidoglycan synthesis E. coli LpoA N-terminal domain and comparison with H. influenzae crystal structure and E. coli NMR Structure

TECHNICAL SKILLS

<i>Programing Languages</i>	<i>Spoken Languages</i>
<ul style="list-style-type: none">• Python: (Highly Proficient)• Julia: (Highly Proficient)• Matlab: (Highly Proficient)• JavaScript/HTML/CSS: (Proficient)• Bash: (Familiar)• C++: (Familiar)	<ul style="list-style-type: none">• English (Native)• Spanish: (Advanced)
<i>Science/Laboratory</i>	
<ul style="list-style-type: none">• Data Analysis/Science• Primate research/training• Spike sorting• Programming• Experiment design	<ul style="list-style-type: none">• Structural Biology<ul style="list-style-type: none">○ Cell cultures, LI-Cloning, PCR○ Protein expression and purification○ X-ray Crystallography, PyMOL

RELEVANT EMPLOYMENT HISTORY

- Instituto de Neurobiología – Universidad Nacional Autónoma de México
 - Position:* **Research Fellow**
 - Contact:* Hugo Merchant Nancy Ph.D
hugomerchant@unam.mx
 - Dates:* September 2019 – current
 - Experience Acquired:* See project under “Research Experience”
- Neuronexus Technologies, Inc.
 - Position:* **Software Engineer Intern**
 - Contact:* NeuroNexus Inc.
+1 (734) 913-8858
 - Dates:* May 2019–August 2019
 - Experience Acquired:* All of the programming was done in Javascript, Python, and C++. The work

was mainly focused on the user interface (Javascript) of Sapiens software platform used in the new SmartboxPro and also backend programming (Python and C++), controlling data acquisition and processing of neural signals.

➤ University of Michigan NSF-IPAN Research Internship

Position: **Undergraduate Research Assistant in Ilka Diester Lab, Albert-Ludwigs-Universität Freiburg**

Contact: Ilka Diester Ph.D.

+49 (0)761 203-8440

ilka.diester@biologie.uni-freiburg.de

Dates: June 2018–August 2018

Experience Acquired: See project under “Research Experience”

➤ University of Michigan Medical School

Position: **Undergraduate Researcher in the lab of Mark Saper**

Contact: Mark A. Saper Ph. D.

+1 (734) 276-6505

saper@umich.edu

Dates: 03/2015 – 08/2019

Experience Acquired: See projects under “Research Experience”

RESEARCH EXPERIENCE

Projects under Hugo Merchant Nancy Ph.D. (INB – UNAM)

Project: Standardize Lab’s Spike Sorting Algorithm

Dates: 09/2019 – 10/2019

My role: clone Kilosort repository (M Pachitariu) from github and customize to the laboratory’s data and computer. Integrated Kilosort (matlab) with Phy2 (python) user interface for manual clustering and merging.

Project: Bayesian Analysis of Rhesus Bias Task

Dates: 10/2019 – current

My role: Analyze neurophysiological data from two Rhesus monkeys who performed a series tapping-continuation tasks which were pulled from one of three underlying distributions: left-skewed, normal, right-skewed. The goal is to further examine the neurological underpinnings of bias in the brain, and how this is represented and developed on the level of single neurons and ensembles.

Projects under Ilka Diester Ph.D. (Albert-Ludwigs-Universität Freiburg)

Project: Analysis of Optophysiological and Behavioral Data from Rats during Reaching Experiments

Dates: 06/2018–08/2018

My role: Analyze optophysiological data from 8 rats who were optogenetically stimulated for multiple trials. This included using Matlab to load the data perform analyses as well as model both channelrhodopsin-1 and sodium channel kinetics. Additionally, I organized the data into a large database (via Matlab) for easy access in the future.

Projects under Mark A. Saper Ph.D. (University of Michigan)

Project: Studying the Interactions of PBP1A and LpoA in *E. coli*

Dates: 01/2015 – 12/2016

My role: I prepared expression plasmids, and purified milligram quantities of both wild-type and the Arg \rightarrow Glu mutant of *E. coli* LpoA. I showed by pull-down assay that the mutant LpoA failed to bind to PBP1A in contrast to the wild-type LpoA.

Project: Structural Determination of *Escherichia coli* LpoA N domain

Dates: 01/2016 – 05/2018

My role: Creating expression construct, purify, crystallize, collect X-ray data, process data, and solve structure of LpoA N domain.

Project: Structural Determination of *Vibrio Cholerae* ShyA, an Endopeptidase

Dates: 08/2017 – 08/2019

My role: Purify, crystallize, collect X-ray data, process data, and solve the structure of a zinc-dependent endopeptidase (ShyA) in *Vibrio cholera*

VOLUNTEERING/OUTREACH

University of Michigan Hospital – Hospital Elder Life Program

Dates: Sept 2016 – Jan 2018

Description: visit with patients and performed interventions with patients sometimes cognitively impaired, on contact precautions, etc.

Emergency Department Volunteer at the Ann Arbor Veterans Association

Dates: Feb 2016 – Sept 2016

Description: Restocking, transporting patients, assisting medical staff, etc.

Tutoring Elementary-Aged Children in Detroit

Dates: 2012–2014

Description: Every Monday I traveled to Detroit, from Ann Arbor, with a group of fellow high school students, and tutored inner-city children once a week.

AWARDS AND RECOGNITION

UM Club Ann Arbor

Recognition for Academic and Community involvement

Manager of the Year

#1 Manager in the state of Michigan for Student Painters (#1 manager in the state of Michigan, Top 10 in the country)

\$110,000 Club Award

Recognized for obtaining at least \$110,000 of revenue for Student Painters

LSA Fund for Scholarships Winner

LSA, Fall 2016–Winter 2017

Making a Difference Award

U of M Department of Volunteering

For always going above and beyond for HELP patients

PEER-REVIEWED PUBLICATIONS

- Angulo, M.T., Kelley, A., Montejano, L. et al. Coexistence holes characterize the assembly and disassembly of multispecies systems . Nat Ecol Evol (2021).

- **Aaron Kelley**, J Vijayalakshmi, and Mark Saper*. “Crystal structures of the amino-terminal domain of LpoA from Escherichia coli and Haemophilus influenza” (2019). Acta Cryst. F75, 368-376.
- Jung-Ho Shin, Alan G Sulpizio, **Aaron Kelley**, Laura Alvarez, Shannon G Murphy, Lixin Fan, Felipe Cava, Yuxin Mao, Mark A Saper, Tobias Dörr. Structural basis of peptidoglycan endopeptidase regulation. In: Proceedings of the National Academy of Sciences 117.21 (2020).