Charles Edelson

cedelson@iu.edu · github.com/edelsonc · edelsonc.github.io

EDUCATION

Dec 2024 (anticipated)
Doctor of Philosophy, Physics
Indiana University Bloomington - Bloomington

Oct 2019
Masters of Science, Physics
Indiana University Bloomington - Bloomington

May 2018
Masters of Science, Data Science
New College of Florida - Sarasota

May 2016
Bachelor of Arts, Physics and Marine Biology
New College of Florida - Sarasota

RESEARCH EXPERIENCE

Aug 2018 - Present
Graduate Research Assistant
Indiana University Bloomington

Dissertation research in the de Ruyter group at Indiana University Bloomington researching how dynamic natural scenery affects optimal estimators of wide-field motion in the Blowfly's (*Calliphora vicina*) visual system. Key responsibilities include the design and construction of a specialized FlEye camera for signal recording, development of reading and validation software for the FlEye camera, statistical modeling of signals and computation of optimal estimators of motion, design and construction of a high intensity LED display, design of software for stimulus generation, and performing in-vivo recording of the H1 visual neuron.

Feb 2023 - Feb 2024
ORAU Journeyman Fellow
Army Research Laboratory

Fellowship researching reflexive agility and control in biological and soft robotic systems. The fellowship focused on laying the groundwork for future works on the design of agile robotics systems, with a heavy emphasis on determining both a qualitative and quantitative definition of agility. Reviewed current literature on the topic and authored an Army Research Laboratory technical report as the fellowships major deliverable.

Aug 2015 - May 2016
Undergraduate Thesis
New College of Florida

Undergraduate thesis at New College of Florida for the completion of a B.A. in Physics and Marine Biology. Project included animal husbandry, construction and computational modeling of a multidirectional Helmholtz coil array, experimental design of magnetic field orientation trails, technical writing in the form of a thesis, and an oral baccalaureate examination before a committee of four professors.

Aug 2015 - Mar 2016 **Mote REU-USFSM Program**
Mote Marine Laboratory

Collaborated with Mote scientists to research the electrosensitivity of adult Sandbar Sharks (*Carcharhinus plumbeus*) in response to prey-simulating electric fields. Conducted regular experimental trails, performed data analysis, and consulted on statistical analysis.

June 2014 - July 2014 **Coral Reef Ecology Field Research Assistant**
Institute for Tropical Ecology and Conservation

A field-research assistantship for the Coral Reef Ecology Course at the Institute for Tropical Ecology and Conservation. Organized and executed marine field research and oversaw student project design and implementation with an emphasis on the safe use of scuba.

TEACHING EXPERIENCE

Aug 2022 - Dec 2022 **P222 Lab Assistant Instructor**
Indiana University Bloomington

Developed and delivered lectures on physical concepts and lab content for introductory electricity and magnetism lab. Supervised student experiments and evaluated student performance both in the laboratory and in weekly lab reports.

June 2020 **Computational Neuroscience Teaching Assistant**
Neuromatch Academy

Facilitated flipped classroom style daily computational neuroscience workshops. Guided students in the design and implementation of independent research projects.

Aug 2019 - Dec 2019 **P221 Lab Assistant Instructor**
Indiana University Bloomington

Developed and delivered lectures on physical concepts and lab content for introductory mechanics lab. Supervised student experiments and evaluated student performance both in the laboratory and in weekly lab reports.

Feb 2018 - May 2018 **Statistical Inference II Teaching Assistant**
New College of Florida

Evaluated weekly assignments and provided feedback on student solutions using GitHub Classroom. Held virtual office hours and provided exam review sessions.

Feb 2015 - Dec 2017 **Physics I & II Teaching Assistant**
New College of Florida

Collaborated with the course professor to write weekly lectures and workshops designed to supplement the course curriculum. Delivered the lectures and supervised student problem solving pods during workshops.

PROFESSIONAL EXPERIENCE

July 2021 **Deep Learning Course Content Reviewer and Editor**
Neuromatch Academy

Reviewed and edited tutorials for the 2021 Neuromatch Academy Deep Learning summer course. Ensured course content was approachable to students and worked to clarify or add content where material was unclear.

Feb 2018 - May 2018 **Data Science Practicum**
Divers Alert Network

Worked with the research division of DAN to apply modern data science techniques to dive accident data. Organized and analyzed survey data, created data dashboards, performed simulated dive experiments, consulted on statistical analyses, wrote internal technical documents, and co-authored manuscripts.

June 2017 - Aug 2017 **Human Cell Types Internship**
Allen Institute for Brain Science

Developed the altasplot R package to simplify creating reproducible brain atlas visualizations. The package brings brain atlas data and visualizations to a wider audience in both the scientific community and general public.

UNIVERSITY SERVICE AND CAMPUS INVOLVEMENT

May 2019 - May 2021 **Physics Graduate Student Council Vice President**
Indiana University Bloomington

This position is responsible for organizing elections and participating in regular cabinet meetings. Additionally, the Vice President oversees the budget and helps organize and execute graduate student gatherings and events. Works as a liaison between graduate students and the administration of the physics department.

Aug 2020 - Dec 2020 **Physics Graduate Student Mentor**
Indiana University Bloomington

Mentored first year physics graduates students and helped them acclimate to the physics PhD program. Provided insight and advice for living in Bloomington and making the most out of their campus resources during the Covid-19 pandemic.

Oct 2019 & Oct 2020 **Indiana University Bloomington ScienceFest Volunteer**
Indiana University Bloomington

Assisted in organization and set-up of the event facilities. Performed scientific demonstration for the general public and provided resources for further education.

PUBLICATIONS

Journal Articles

- L.M. Crawford, **C.J. Edelson**, R.E. Hueter, J. Gardiner, "Behavioral electrosensitivity increases with size in the sandbar shark, *Carcharhinus plumbeus*", *Environmental Biology of Fishes* (2024). https://doi.org/10.1007/s10641-024-01514-5

- P. Buzzacott, **C.J. Edelson**, J. Chimiak, F. Tillmans, "Health and wellbeing of recently active U.S. scuba divers", *Diving and Hyperbaric Medicine*, Volume 52, No. 1, March 2022, pp. 16-21

- P. Buzzacott, **C.J. Edelson**, C.M. Bennett, P.J. DeNoble, "Risk factors for cardiovascular disease among active adult US scuba divers", *European Journal of Preventive Cardiology*, Volume 25, Issue 13, September 2018, pp. 1406-1408

Technical Reports

- (Available on request) **C.J. Edelson**, M. Haile, G. Barber, M. Bundy, "On Agility and Control of High-Dimensional Dynamical Systems", ARL-TR-9901, Army Research Laboratory, April 2024

- (Contributor) P.J. DeNoble, Eds., "DAN Annual Diving Report 2019 Edition", Durham: Divers Alert Network, 2019

CONFERENCE PRESENTATIONS

Presentations

- **C.J. Edelson**, R.R. de Ruyter van Steveninck, S. Setayeshgar, W.S. Bialek, "Natural Visual Input Implies Estimation Biases in a Blowfly Motion Sensitive Neuron", American Physical Society March Meeting, Minneapolis, Minnesota, March 2024

- **C.J. Edelson**, L.M. Crawford, "Discovery of potential novel biomarkers of mercury bioaccumulation using supervised machine learning in a keystone predator" Joint Meeting of Ichtyhologists & Herpetologists, Norkfolk, Virginia, July 2023

- L.M. Crawford, N. Dheilly, **C.J. Edelson**, A. McElroy, "Mercury bioaccumulation is linked with immunosuppression in the northwest atlantic white shark (*Carcharodon carcharias*)", Joint Meeting of Ichtyhologists & Herpetologists, Norkfolk, Virginia, July 2023

- **C.J. Edelson**, R.R. de Ruyter van Steveninck, W.S. Bialek, S.R. Sinha, "Pitch acts as a distractor in optimal estimation of yaw in dynamic natural scenery", American Physical Society March Meeting, Las Vegas, Nevada, March 2023

- P. Buzzacott, A. Leishman, **C.J. Edelson**, J.E. Blatteau, "Vietnamese fishermen dive profiles, simulated modifications and new diver profile analysis freeware", South Pacific Underwater Medicine Society Annual Scientific Meetings, HMAS Penguin, Sydney, May 2021

- P. DeNoble, V. Papadopoulou, P. Buzzacot, **C.J. Edelson**, M. Pieri, D. Cialoni, K. Lambrects, C. Belastra, A. Marroni, "Inter-Individual variability of post-dive venous gas bubbles occurrence: an invitation for multigentric collaborative study", Second Tricontinental Conference on Diving and Hyperbaric Medicine, Durban, South Africa, Sep 2018

Posters & Proceedings

- H. Kramer, **C.J. Edelson**, S. Setayeshgar, R.R. de Ruyter van Stevenick, "Motion estimation from optical flow using camera mimicking blowfly visual processing", American Physical Society March Meeting, Minneapolis, Minnesota, March 2024

- P. Buzzacott, **C.J. Edelson**, J. Chimiak, "Health status of active U.S. scuba divers 2011-2017", *Undersea and Hyperbaric Medicine*, Volume 47, Issue 2, June 2020, pp. 340

- P.J. DeNoble, V. Papadopoulou, P. Buzzacot, **C.J. Edelson**, M. Pieri, D. Cialoni, K. Lambrects, C. Balestra, A. Marroni, "Consistency of venous gas emboli status after three controlled pool diving exposures: a pilot study", *Undersea and Hyperbaric Medicine*, Volume 45, Issue 5, June 2018, pp. 547

SEMINAR PRESENTATIONS

- "Statistical Hypothesis Testing for Physicists", Homer A. Neal Student Seminar Series, Indiana University, April 2022
- "Modern Data Science: An Overview", Homer A. Neal Student Seminar Series, Indiana University, Sep 2022
- "Entropy - History and Application to Data Science", Statistics Seminar, New College of Florida, Dec 2017
- "Multidimensional Scaling", Statistics Seminar, New College of Florida, Oct 2017
- "Going with the Flow - Derivation and Application of the Equations of Motion for Fluids", Physics Seminar, New College of Florida, Sep 2015

AWARDS AND GRANTS

Awards

Spring 2024	American Physical Society DBIO Travel Award
Spring 2023	Indiana University College of Arts and Sciences Travel Award

TECHNICAL SKILLS

Programming Languages: Python · R · MATLAB · Mathematica · Go (familiar) · Rust (familiar)
Popular Libraries/Framework: Scipy · Numpy · SciKit Learn · Pandas · PyTorch · Tidyverse
Development Tools: Git · Tmux · Jupyter · LaTeX · Markdown · Google Colab · SQL · Pipenv