

Charles Fieseler

Research Interests

Key Words Dynamical systems, strongly interacting systems, data-driven discovery, control theory, network control, biophysics, *C. elegans*, whole brain imaging

Description I apply data-driven techniques like Dynamic Mode Decomposition (DMD) and Sparse Identification of Nonlinear Dynamics (SINDy) to neural recordings. Recent work focuses on learning control signals for non-autonomous systems.

Education

2015–present **PhD in Physics**, *University of Washington*, Advisor: J Nathan Kutz.

2009–2013 **B.S. in Physics and Math**, *University of Kentucky*.

Publications

- [1] Blyth et al. First observation of p -odd γ asymmetry in polarized neutron capture on hydrogen. *arXiv preprint arXiv:1807.10192*, 2018.
- [2] Charles Fieseler, James Kunert-Graf, and J Nathan Kutz. The control structure of the nematode *caenorhabditis elegans*: Neuro-sensory integration and proprioceptive feedback. *Journal of biomechanics*, 74:1–8, 2018.
- [3] Charles Fieseler and J Nathan Kutz. Simultaneous learning of control signals, parameters, and model structure [arxiv]. 2019.
- [4] Charles Fieseler, Manuel Zimmer, and J Nathan Kutz. Unsupervised learning of control signals and their encodings in *C. elegans* whole-brain recordings [in proceedings].
- [5] Megan Morrison, Charles Fieseler, Manuel Zimmer, and J. Nathan Kutz. Nonlinear control for *C. elegans* whole brain imaging [in proceedings]. 2019.

Fellowships

2015–present **National Science Foundation Graduate Research Fellow**, *University of Washington*.

Additional Research Experience

Computational

2012–2013 **Condensed Matter**, *University of Kentucky*.
Developed simulations for novel SU(N) symmetric materials.

Experimental

- Summer 2010 **Oak Ridge National Lab**, *Knoxville, TN*.
Characterized detectors for NPD γ experiment.
- Summer 2011 **Research Experience for Undergraduates**, *University of Washington*.
Developed new method for characterizing laser profiles.

Teaching Experience

- 2019–present **Teaching Reading Course**, *University of Washington*.
Leading a reading course on educational research.
- 2015–2016 **Graduate Teaching Assistant**, *University of Washington*.
Teaching assistant for laboratory courses.
- 2013 **Undergraduate Teaching Assistant**, *University of Kentucky*.
Help develop a new active learning course for non-physics majors.
- 2013–2015 **Language Teacher**, *Japanese Government*, Taragi, Kumamoto, Japan.
Non-English speaking work environment; taught high school English classes as an assistant and as a primary teacher; designed long-term curricula and test materials; cultural and science education outreach; prefectural-wide professional presentations.

Computer skills

- Languages MATLAB (advanced), Python (intermediate), C/C++ (int.), Julia (int.)
Other Latex (int.), Inkscape (int.), G. suite (int.)

Non-Academic Experience

Non-profit

- 2017–present **Secretary of the Board**, *Savoy Swing Club*, Seattle.
Run weekly dance event; safer spaces committee, dealing with legal and ethical issues.
- 2018–present **Co-founder**, *Coalition For Safer Spaces*, Seattle.
Formalize the response of the swing dance community to sexual assault allegations; proactively reduce other forms of discrimination and marginalization.

High School Teaching

- 2013–2015 **Assistant Language Teacher**, *Japanese Government*, Taragi, Kumamoto, Japan.
Japanese language work environment; taught English classes as an assistant and as a primary teacher; designed new long-term curricula; cultural and science education outreach.

Languages

- English Native
Japanese Advanced *N2 Japanese Language Proficiency (second highest)*

References

Professors

- o J Nathan Kutz
- o Manuel Zimmer