David Hickey

Education

Max Planck Institute for Dynamics and Self-Organisation **Göttingen, Germany**
Doctoral candidate, Graduated summa cum laude *2019–2023*
Thesis title: "Hydrodynamics in ciliary systems" under Professor Ramin Golestanian

- Data analysis and simulation of fluid flow with C++, Mathematica and Python
- Data visualisation and plotting with Python and the Matplotlib library
- Visualisation of 3D environments with POV-Ray
- Use of high-performance computing facilities to generate and analyse data

Imperial College London **London, United Kingdom**
Physics with Theoretical Physics MSci, Graduated first class with honours *2015–2019*
Thesis title: "A Complexity Science Approach to Atrial Fibrillation" under Professor Kim Christensen

- Simulation of a cellular automaton model of a heart using Python and C
- Data visualisation and plotting with Python and the Matplotlib library
- Use of high-performance computing facilities to generate and analyse data

Employment

Eigen Ltd. **Leatherhead, United Kingdom**
Junior Developer *2017–2017*

- Wrote frontend and backend of an internet of things module for environment monitoring, using Tomcat backend and ReactJS JavaScript framework

Eigen Ltd. **Leatherhead, United Kingdom**
Junior Systems Engineer *2016–2016*

- Used Arduino and OneWire protocol to produce internet of things module
- Wrote scripts to perform secure data transfer to a remote server
- Interacted with clients to solve problems with system configurations

Eigen Ltd. **Leatherhead, United Kingdom**
Junior Developer *2015–2015*

- Used JavaScript and the `raphael.js` framework to present data in an intuitive manner
- Developed a data visualisation library to replace previous solution
- Maintained and patched code written by colleagues
- Wrote Python and Java command-line tools to interface with company tools, to determine server status and performance and test correctness

Awards and Honours

Tessella Software Prize: awarded for best-in-year Master's project

Dean's List: awarded for achieving top 10% of grades in degree program

EMBO Poster 2nd Prize: awarded for 2nd best overall poster in EMBO conference 2023

Publications

- Hickey DJ, Vilfan A & Golestanian R. (2021). "Ciliary chemosensitivity is enhanced by cilium geometry and motility" *eLife*, 10.
- Falkenberg M, Coleman JA, Dobson S, Hickey DJ, Terrill L, et al. (2022). "Identifying locations susceptible to micro-anatomical reentry using a spatial network representation of atrial fibre maps" *PLOS ONE*, 17.
- Hickey DJ, Golestanian R & Vilfan A. (2023). "Nonreciprocal interactions give rise to fast cilium synchronisation in finite systems" *arXiv* (under review at PNAS).

Conferences

- Third Infinity 2020, Göttingen.
- APS March Meeting 2022, Chicago.
- Third Infinity 2022, Göttingen.
- EMBO Physics of Living Systems 2023, Dresden

Teaching

- TA in Physics of Complex Systems, Göttingen, 2022
- TA in Machine Learning – Hands On, Göttingen, 2022
- TA in Image Processing, Göttingen, 2022
- PhD buddy, Göttingen, 2022–2023

Skills

Programming: C++, Python (including `scipy`, `numpy`, `matplotlib`, Python/C API), Bash, Java, and JavaScript (including `ReactJS`, `raphael.js`, `jQuery`)

High Performance Computing: Use of HPC facilities for parallel processing of large datasets

Operating systems: Linux, Windows, Mac OSX

Software: LaTeX, Git, Bazaar, Microsoft Office

Languages: English (native), German (B2.2)

Volunteering and Charity Work

- Signed *Giving What We Can* pledge to donate at least 10% of income to cost-effective charity until retirement
- Volunteered as young leader for local Cub-Scout group
- Volunteered to manage Access database for Art In Action charity

Projects and Extracurriculars

Raspberry Pi file-sync server: Hosted my own file-syncing solution on a Raspberry Pi in order to sync files between my laptop and desktop, and automate backups using `cron`

Private Git server: Hosted my own Git server on a Raspberry Pi

Modifications to Linux Mint Cinnamon Desktop Environment: Made some tweaks to Linux Mint's code in order to improve my workflow

ExplainXKCD Firefox Extension: Wrote a Firefox extension to add an 'Explain' button to the XKCD webcomic

Physics Society Hackathon: As part of a team, created a rubber-ducky USB business card from a Raspberry Pi Zero; when plugged into a computer via USB it emulated a keyboard and would type out whatever it was configured to type

Backpropagating Neural Network: Implemented backpropagating neural network algorithm to gain experience with this type of modelling

Referees

Dr. Andrej Vilfan
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