






# JOHANN DRAYNE



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## EXPERIENCE



- Graduate Research Assistant**  
**Quantum Devices Group @ Stewart Blusson Quantum Matter Institute**

 September 2021 – July 2024  
 Vancouver, Canada
- Led the **full research cycle** on **nanoscale semiconductor quantum dots**, including design, fabrication, measurement, analysis and communication through meetings, presentations and scientific papers (Link to Master's Thesis).
  - Conducted **low-temperature** (20 mK) electrical measurements using **voltage sources, current meters and lock-in amplifiers** to characterise charge transport in quantum dots.
  - Co-developed updated data collection processes using **IGOR**, enhancing instrument communication and data management. Actively contributed to a large codebase through **Git** version control. Created a custom **Python** parser to visualise function dependencies in the **IGOR** repository, facilitating onboarding for new team members.
  - Leveraged **Python** for data preprocessing and analysis, including **downsampling** and **outlier removal** due to the 10GB of nightly data, streamlining the analysis process. Employed **simultaneous fitting** techniques to validate data against theoretical models.
  - Consistent execution in high-stakes device fabrication within a cleanroom, managing gas systems, cryogenics, and electrical components with precision under pressure.
  - Mentored undergraduate and graduate students in data analysis techniques and instrument operation, fostering independence and enhancing lab productivity.
  - Presented research findings at international conferences, including Quantropy 2022, 2024, and March Meeting in Las Vegas 2023, communicating complex concepts to diverse audiences.

- Research Assistant**  
**Weber Lab @ BC Children's Hospital Research Institute**

 January 2021 – August 2021  
 Vancouver, Canada
- Developed a preprocessing pipeline in **Bash** for fMRI brain scans, enabling streamlined data handling. Utilised **R** for data cleaning and modelling, employing **linear mixed effects** models to analyse changes in **fractal dimension** across subject categories. Repository: WeberLab/LRTC\_PLOSCOMPLEX. Published paper: PLOS Complex Systems.

- R&D Engineer & Project Lead**  
**Jans Composites**

 April 2020 – December 2020  
 Antrim, Northern Ireland
- Lead the end-to-end development of a touchless hand washing station, delivering a market-ready product through R&D, strategic supplier sourcing, efficient production management, targeted sales and marketing efforts.

## PROJECTS

- **Dash app** that takes .DXF files and computes quantum properties to streamline device design. johann997/2deg\_yodels
- Utilised a temperature sensor and **Arduino Uno WiFi** to transmit sensor data to a **PostgreSQL** database. I used **SQL** in **Grafana** to visualise the data for real-time and remote monitoring.

## EDUCATION

- University of British Columbia**  
**University of British Columbia**

**M.Sc. Physics**  
**B.Sc. Honours Physics (with Distinction)**

 May 2022 – July 2024  
 September 2017 – May 2022

## SKILLS

- |                     |   |
|---------------------|---|
| <b>Languages</b>    | Python, SQL, Bash, R, MATLAB, Arduino, IGOR, PHP, HTML, C                                   |
| <b>Technologies</b> | Tableau, git, conda, Jupyter, Excel, $\text{\LaTeX}$ , Docker                               |
| <b>Libraries</b>    | scikit-learn, pandas, plotly, dash  |
| <b>Hardware</b>     | Lock-in amplifier, BlueFors dilution refrigerator, Electron Beam and Photo Lithography      |
| <b>Core</b>         | Curious, Collaboration, Problem Solving, Adaptability, Storytelling, Initiative, Enthusiasm |

## AWARDS

- |  |                        |
|--|------------------------|
| <b>International Tuition Award</b>                 | 2022, 2023             |
| <b>Dean's Honour List</b>                          | 2018, 2019, 2021, 2022 |
| <b>Rosemary Stewart and Ioan James Scholarship</b> | 2022                   |

## COURSES

- |   |   |
|---|---|
| • Quantum Mechanics (Graduate UBC)        | • Nanoscale Modelling and Simulation (Graduate UBC) |
| • Theory of Measurement (Graduate UBC)    | • IBM Data Science (Coursera)                       |
| • Condensed Matter Physics (Graduate UBC) | • Tableau for Data Scientists (LinkedIn)            |