# JordanRoszmann

*Mechanical EIT, PhD*

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## Highlights

**A fresh PhD and EIT,** I pursued experimental research for ten years, designing and programming research furnaces and writing simultion software. Having built knowledge and skills for their own sake, I am eager to apply them to a new project with a positive impact.

**Design**

**Thermal/fluid** design and fabrication of research furnaces for semiconductor growth and magnetic refrigeration prototypes including a cryogenic helium circulator. I teach design and optimization of thermal fluid systems at UVic.

**Mechanical** design and fabrication of motion control, cutting equipment, glassware, seals, motion control and laser optics for graduate research including equipment for use in cleanrooms. Produced prototypes using hand and machine tools.

**Software**

**Design** using Solidworks, AutoCAD and Draftsight.

**FEA and CFD** using ANSYS, CFX, Fluent and OpenFOAM. Also developed a dedicated 4000-line finite element application in C++ using the Deal.II library.

**Analysis** in Matlab and Excel daily. Visualization in Paraview

**Embedded Control Systems** in VB, C++, Labview, Arduino, MDrive, PLC

**Development** in Visual Studio, vim, KDevelop

**Communication**

**Published** articles in the Journal of Crystal Growth. Won grants for GoWEST and Research.

**Lectured** engagingly to classes of 20 to 150 students. Presented project results to military and commercial clients.

**Amiable,** attentive and engaging collaborator with colleagues, clients, students and contractors.

**Collaborated** on English and French research teams. Used Slack, svn, git

**Leadership**

**Hired and led** four staff at GoWest, growing program by 15%. Resolved conflicts and achieved difficult budget consensus as strata corporation President.

## Education

**Doctor of Philosophy**, *University of Victoria (Cumulative GPA 9.00)* *November 2016*
*Simulation and Growth of CdZnTe Crystals from Small Seeds by THM*

**Master of Applied Science**, *University of Victoria* *June 2009*
*Application of Rotating Magnetic Fields to Growth and Purification of Semiconductors*

**B.Eng in Mechanical Engineering**, *University of Victoria*, *With Distinction* *June 2006*

## Experience

### Teaching

**Sessional Lecturer**, *Department of Mechanical Engineering* *2015–Present*
*University of Victoria, Victoria BC*

Teaches HVAC, thermodynamics, heat transfer and design of thermofluid systems to classes of 25 to 150 mechanical or electrical engineers. iClicker and Moodle used extensively, highly responsive and clear instructor.

### Engineering

**Postdoctoral Fellow**, *University of Alberta* *Jul 2016 – Dec 2016*
*Department of Statistical and Mathematical Sciences*

Airflow simulation and optimization for solar updraft towers. Modelled the air flow and heat transfer in Matlab and OpenFOAM, and Solidworks. (NSERC Engage Project)

**Research Engineer**, *University of Victoria* *Jan 2016 – Jun 2016*
*Department of Mechanical Engineering*

Consulted for Dynamic Systems Analysis of Victoria to improve dynamic finite element models in their ProteusDS software. Implemented new algorithms in Matlab, collaborated using Slack.

**Graduate Researcher**, *Crystal Growth Laboratory* *2006–2016*
*University of Victoria, Victoria BC*

Experimental and analytical research and development projects in zone refining of cadmium and tellurium and growth of CdZnTe crystals.

Thermal design and multiphase flow simulations in ASYS/CFX and a purpose-built finite element code written in C++ using deal.ii. Analyzed smaller projects in Matlab and Excel.

Designed, built and maintained research furnaces, glassware, hydrogen supply, high-vacuum systems and cutting tools. Specified parts and assemblies using Solidworks and AutoCAD, and fabricated parts on mill and lathe. Assembled and tested power supplies for heaters, motors and Helmholtz coils.

Designed and programmed control systems with PID controllers, PLC, MDrive, Arduino. Wrote control software in Visual C++, VB and Labview. Simulated the semiconducting solid/liquid mixture in ANSYS/CFX and a new deal.II application. Analyzed smaller projects in Matlab/Octave, Mathmatica and Excel.

**Teaching Assistant**, *Department of Mechanical Engineering* *2006-2015*
*University of Victoria, Victoria BC*

Marked, supervised labs, lectured, and helped students in Engineering Materials, Fuel Cell Technology, Fluid Dynamics, Heat and Mass Transfer, Transport Phenomena, Mechanical Design, and Finite Element Analysis. Graded 90 co-op reports in 45 hours giving constructive feedback and following up with students.

**Mitacs Intern**, *5N Plus Inc.*, *Montreal QC* *Apr–Jun 2007*

Proposed and evaluated changes to cadmium zone-refiners and specified a laser-absorption test apparatus. Paid internship working in French and English.

**Research Assistant**, *Cryofuels Laboratory* *Jan–Dec 2005*
*University of Victoria, Victoria BC*

Designed, built and tested a cryogenic helium circulator with cryostat and cryocooler and designed a bench-top magnetic refrigerator using Solidworks.

Wrote Labview control software and packaged and calibrated sensors. Optimized heat exchangers using MathCAD, Matlab, and REFPROPS.

**Environmental Co-op**, *Department of National Defence* *May–Aug 2004*
*Fleet Maintenance Facility Cape Breton, Esquimalt BC*

Recommended changes to liquid waste management to ensure Fisheries Act compliance in graving dock and marine railway.

**Director**, *Go Women in Engineering Science and Technology* *Jan–Aug 2003*
*University of Victoria, Victoria BC*

Hired and led four staff. Set and met program objectives and $50,000 budget. Increased outreach by %25 and earned grants to continue the program.

**Engineering Co-op**, *SNC-Lavalin Defense Programs Inc.* *Sep 2002 – Apr 2003*
*Esquimalt BC*

Managed maintenance and repair projects on six maritime coastal defense vessels following ISO 9001 practices.

Specified repair work using AutoCAD, selected contractors by competitive bid, and worked with tradesmen to ensure correct repair. Tracked projects in Access.

Volunteer

**President**, *Caywood Court Strata*, *Victoria BC* *2010*

**Secretary**, *Caywood Court Strata*, *Victoria BC* *2009*

**Treasurer**, *Engineering Students' Society*, *Victoria BC* *2002*

## Awards

**Alexander Graham Bell Canada Graduate Scholarship**, *NSERC*, *$70,000* *2010*

**Canada Graduate Scholarship**, *NSERC*, *$35,000* *2006*

**President's Award**, *University of Victoria*, *$4,000* *2006*

**Undergraduate Student Research Award**, *NSERC*, *$4,500* *2005*

**T.S. McPherson Entrance Scholarship**, *University of Victoria*, *$22,500* *2001*

## Publications

J. Roszmann, M. Sekhon, and S. Dost. Measurement of the diffusivity of CdTe in liquid Te at crystal growth temperatures, *J. Crystal Growth*, 411, 30-3, 2015. DOI: 10.1016/j.jcrysgro.2014.10.051

J. Roszmann, S. Dost, and B. Lent. Crystal growth by the travelling heater method using tapered crucibles and applied rotating magnetic field, *Crys. Res. and Tech.*, 45(8), 785-90, 2010. DOI: 10.1002/crat.201000269

J. Roszmann, Y.C. Liu, S. Dost, B. Lent, S. Grenier, and N. Audet. Use of rotating magnetic field for selenium impurity transport in zone refining of tellurium and cadmium, *FDMP*, v 5, p231-244, 2009. DOI: 10.3970/fdmp.2009.005.231

S. Dost, Y.C. Liu, J. Haas, J. Roszmann, S. Grenier, and N. Audet. Effect of applied electric current on impurity transport in zone refining, *J. Cryst. Growth*, 397:211-18, 2007. DOI: 10.1016/j.jcrysgro.2007.06.008

A. Tura, J. Roszmann, J. Dikeos, and A. Rowe. Active magnetic regenerator test apparatus, *AIP Conf. Proc.*, 2006. DOI: 10.1063/1.2202511