

# Autumn Fjeld

Kaerntner Strasse 305/9  
8700 Leoben  
Austria

autumn.fjeld@mu-leoben.at  
autumn@nmutua.com  
+43 650 925 1514  
U.S. Citizen

## EDUCATION

### **University of California, Berkeley – Doctor of Philosophy**

Materials Science & Engineering, December 2005

Professor James W. Evans

*Mathematical Modeling and Experimental Investigations of the Gas Fluxing of Aluminum*

### **University of California, Berkeley – Master of Science**

Materials Science & Engineering, May 2001

Professor Fiona Doyle

*Macromolecular Stabilization of Supported Liquid Membranes*

### **Arizona State University – Bachelor of Science**

Chemical Engineering, May 1997

Magna Cum Laude

## RESEARCH

### **Post Doctoral Research – University of Leoben, Austria**

#### **Simulation & Modeling of Metallurgical Processes** June 2006 - Present

- Currently simulating the casting of a large composite, i.e two-part, rolling mill roll, including flow behavior during filling, remelting and solidification; simulations have been carried out within the framework of FLUENT with user defined codes written to expand the functionality of the core program.
- Working in partnership with Austrian industry, investigating casting process areas suitable for optimization via analysis with computational continuum mechanics modeling, with the primary aim of understanding the remelting and the subsequent solidification/bonding between the composite parts.
- Defined experimental investigations for our industry partner including cooling curve analysis, compositional and metallurgical sampling of the casting, studies of the filling and pouring stream behavior and investigation of process temperatures.
- Identified, through experimentally verified models, the main influences on dynamics model, capturing the flow patterns in the liquid pool during casting and the project in a clear direction, providing our industrial partner with new insight into their casting process.

### **PhD – University of California, Berkeley**

#### **Materials Science & Engineering** June 2001 - June 2006

- Collaborated in a five year project with Alcoa, Inc. to optimize a molten aluminum purification process, with specific goals to reduce toxic chloride emissions and improve energy efficiency. Developed and evaluated multiple computational fluid dynamics (CFD) models of the aluminum purification process in an industrial stirred tank reactor using FLUENT, simulating two phase flow interactions in an rotary gas injection vessel.
- Assessed and compared mixing, residence time, and bubble distribution for different operating conditions and impeller configurations in each CFD model.

- Carried out experimental investigations in an industrial purification unit at the Alcoa Technical Center with a novel bubble detection probe in molten aluminum; used experimental findings to validate and fine tune CFD model results.
- Employed high speed photography and image analysis to investigate the reduction of particulate emissions in an industrial fluxing unit via laboratory simulation of bubble bursting and droplet splashing at the surface of a molten metal.
- Utilized a variety of computational and data analysis tools: Femlab, FLUENT, Matlab, Mathematica, GAMBIT.

### **MS – University of California, Berkeley**

#### **Materials Science & Engineering** July 1999 - June 2001

- Researched and developed experimental thin films for supported liquid membranes with an application towards filtration of acetic acid.
- Investigated processing techniques and properties of epoxy films applied to a membrane surface to seal liquid extractant into pores of supporting membrane.
- Investigated novel layer-by-layer assembly of polyelectrolytes to be used as thin films encasing extractant in supported liquid membranes.

## **TECHNICAL EXPERIENCE**

### **Process Engineer - Dow Chemical Corporation, Freeport, TX**

#### **Process Engineering Department** September 1997 - June 1999

- Led the Fluid Flow team in serving plant design needs, gathering process information, and applying software design tools.
- Created equipment database for Process Engineering, providing the department with a single tool to electronically store and communicate information during the design phase of a project.
- Served on core project team for grass roots chemical plant; designed plant equipment and worked on plant development. Completed air permit calculations for Canadian Government.

### **Chemical Engineering Intern – Dow Chemical Corporation, Freeport , TX**

#### **Department of Epoxy Process Research** Summer 1996

- Developed model to track plant materials and aid in troubleshooting plant material balances.
- Developed vessel fluid level correlations for material mass accounting and monitoring.
- Researched possible causes of polymer formation in a heat exchanger.

### **Summer Intern Flood Control District of Maricopa County – Phoenix, AZ**

#### **Environmental Branch** Summers 1992 - 1994

- Assisted in environmental projects for National Pollution Discharge Elimination System Permits.
- Monitored storm water in Phoenix and checked purity for compliance with EPA standards.
- Developed a Storm Water Manual to be used by industries in the metro Phoenix area.

## **TEACHING EXPERIENCE**

### **Teaching Assistant - University of California, Berkeley**

#### **Materials Production** Fall 2001

- Prepared weekly homework solutions and assisted students with questions regarding course material during office hours.
- Prepared occasional lectures and supervised exams throughout the semester.
- Graded weekly homework assignments and course exams and maintained cumulative records of student scores.

**Laboratory Instructor/Lecturer - University of California, Berkeley**

**Materials Science & Engineering, Introduction to Materials Science** Fall 2000

- Prepared and delivered background lectures on the core experimental concepts of the Introduction to Materials Science course. Provided instruction on lab techniques and proper use of lab equipment.
- Worked closely with students during laboratory, providing individual assistance with problems and questions. Assisted students with data analysis and lab reports outside of lab.
- Received Outstanding Graduate Student Instructor Award, based on end-of-semester student evaluations of the class.

**Assistant to Staff & Students - Southbank University, London, England**

**School of Land Management and Urban Development** Summer 1995

- Provided technical assistance to office staff as they transitioned to a computer based work environment.
- Assisted students and professors with administrative and academic concerns.

**HONORS/FELLOWSHIPS/GRANTS**

- Outstanding Graduate Student Instructor Award at Berkeley
- Recipient of Jane Lewis Fellowships 2001/2002 and 2003/2004 at Berkeley
- Tau Beta Pi Engineering Honor Society
- Dow Chemical Outstanding Junior Award
- Grant written and awarded for computational resources at the Pittsburgh Supercomputing Center