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## ARJUN S. ADHIKARI

### EDUCATION

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#### **Stanford University, Stanford, California**

*Doctor of Philosophy in Chemical Engineering* (September 2008 – Present)

- Advisor – Dr. Alexander Dunn
- Research Focus – Single Molecule Biophysics, Force Mediated Extracellular Matrix Remodeling

#### **Polytechnic University (Polytechnic Institute of NYU), Brooklyn, New York**

*Masters of Science in Chemical and Biological Engineering* (Sept 2006 - June 2008)

- Advisor – Dr. Stavroula Sofou
- Thesis – Fluorescence based methods for the detection of lateral heterogeneities in lipid membranes

*Bachelor of Science in Chemical and Biological Engineering* (Sept 2004 - June 2008)

- Summa Cum Lauda
- Outstanding Graduate Award
- GPA 3.95/4.00

### AWARDS

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Stanford Bio-X Travel Award (November 2010)

Stanford Graduate Fellowship (2010-2013)

Tau Beta Pi Fellowship – 2008-2009

Outstanding Graduate Award – Polytechnic University (June 2008)

Sidney A. Savitt Award – Chemical Engineering Graduate Award (June 2008)

AIChE Student Conference Poster Competition – 1<sup>st</sup> Place (November 2007)

Othmer-Jacobs travel award, 2007 (For attending AIChE National Conference)

NYSTAR Undergraduate Research Fellowship, June 2007 – June 2008

Tau Beta Pi Stable Scholarship, 2007-2008

DAAD (German Academic Exchange) RISE Fellowship, 2006

Bauerle Endowed Scholarship, 2006

Tau Beta Pi (National Engineering Honors Society), 2006

Omega Chi Epsilon (Chemical Engineering Honors Society), 2006

Polytechnic University Honors College Student

Dean's List (all semesters)

Honors College full tuition scholarship

### PUBLICATIONS

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1. **Arjun Adhikari**, Jack Chai, Alexander Dunn “Mechanical Load Induced a 100-fold increase in the Rate of Collagen Proteolysis by MMP-1” *Accepted J. Am. Chem. Soc.*
2. **Arjun Adhikari**, Xueling Zhao, Stavroula Sofou, “A fluorescence-based method for the evaluation of lateral phase separations in lipid membranes”, *in preparation*
3. Gautam Bajagur Kempegowda, Shrirang Karve, Amey Bandekar, **Arjun Adhikari**,

Tamara Khaimchayev, Stavroula Sofou “pH-Dependent Formation of Lipid Heterogeneities Controls Surface Topography and Binding Reactivity in Functionalized Bilayers”, *Langmuir* **2009**, 25 (14)

## PRESENTATIONS

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1. *Effect of Applied Load on Collagen Model Trimer Cleavage by MMP-1*, **Arjun Adhikari**, Jack Chai, Alexander Dunn, AIChE National Conference, Salt Lake City, Utah (Nov 2010)
2. *Force Mediated ECM Substrate Proteolysis by MMPs*, **Arjun Adhikari**, Jack Chai, Alexander Dunn, Bio-X Symposium, Stanford University (Aug 2010)
3. *Fluorescence based methods for the detection of lateral heterogeneities in lipid membranes*, **Arjun Adhikari**, Xueling Zhao, Tamara Khaimchayev, Stavroula Sofou. Second Conference on Drug Delivery and Translation Research, Polytechnic University, NY (May 2008)
4. *Detection of pH-tunable “Raft Switches” using fluorescence markers in rigid liposome membranes*, **Arjun Adhikari**, Thomas Burns, Xueling Zhao, Stavroula Sofou. AIChE Student Conference, Salt Lake City, Utah (November 2007)
5. *Detection of pH-tunable “Raft Switches” using fluorescence markers in rigid liposome membranes*, **Arjun Adhikari**, Thomas Burns, Tamara Khaimchayev, Xueling Zhao, Stavroula Sofou. New Student Convocation – Polytechnic University, NY (August 2007)

## RESEARCH EXPERIENCE

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*Stanford University, Department of Chemical Engineering*, Stanford, CA (April 2009-Present)

### **“Characterize effect of force on proteolysis of ECM proteins by Matrix Metalloproteinases”**

Cleavage of ECM proteins like Collagen and Fibronectin are instrumental in cell motility, wound healing and cancer metastasis. All these processes involve force and proteolysis. My interest is to study the effect of applied load using Magnetic Trap on the cleavage of these proteins by Matrix Metalloproteinases.

### **“Development of massively parallel flow based single molecule force assay”**

Unfold FRET labeled DNA hairpins attached to long DNA molecules using shear flow. Use single molecule fluorescence to study several molecules in a given field of view and thus develop a highly parallelized and cost effective single molecule assay.

*Polytechnic University, Laboratory of Drug Delivery Systems*, Brooklyn, NY (September 2006 – June 2008)

### **“Detecting “Raft Switches” using fluorescence markers in rigid liposome membranes”**

A method was developed for the study of lipid membranes containing ‘raft-switches’: lipid phase-separated domains formed by decreasing pH. Membranes containing pyrene-labeled lipids were studied for phase separation using fluorescence spectroscopy. Domain formation kinetics and reversibility were evaluated, and the effect of electrostatics on lipid-phase separation was accessed.

*Martin Luther Universitat, Department of Thermal Separation Process*, Halle, Germany (Summer 2006)

### **“Effect of Lithium Sulfate Salt concentration on extraction of Urease”**

Find feasible ways of using crystallization as a protein purification method on an

industrial scale. My main responsibility was to analyze the effects of lithium sulfate salt concentration on the extraction of urease from jack beans.

## **TEACHING EXPERIENCE**

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1. *Teaching Assistant, Chemical Engineering Kinetics*, Department of Chemical Engineering, Stanford University (Sept 2009 – Dec 2009), (Jan 2010 – Mar 2010)
2. *Teaching Assistant, Drug Delivery*, Department of Chemical and Biological Engineering, Polytechnic University (Feb 2008 – Jun 2008)
3. *Teaching Assistant, Transport Phenomena*, Department of Chemical and Biological Engineering, Polytechnic University (Sep 2007 – Dec 2007)
4. *Head Tutor/Chemistry Team Leader*, Polytechnic Tutoring Center (Feb 2006 – Jun 2007)

## **EXPERIMENTAL SKILLS**

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**Techniques:** Fluorescence Spectroscopy, Single Molecule Total Internal reflection Fluorescence (TIRF), Single Molecule Fluorescence Resonance Energy Transfer (FRET), Magnetic Tweezers, Dynamic Light Scattering, Size Exclusion Chromatography, Fabrication of Nanoparticles (liposomes), Standard Molecular Biology Techniques: Cell culture, Mini and Maxi Preps, Protein Expression and Purification, PCR, Gel Purification, Cloning.

**Instrumentation:** Built Single Molecule TIRF Microscope, Magnetic Tweezers and designed and constructed a micro-fluidic system for highly parallelized single molecule force assay.

## **LEADERSHIP POSITIONS AND EXTRACURRICULAR ACTIVITIES**

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1. **Students Mentored:** Graduate – Cassie Liu, Jian Fung, Jack Chai. Undergraduate – Larissa Yi, Xueling Zhao, Thomas Burns
2. Participated in the Bay Area Maker Faire – May 2010
3. Helped Dr. Sofou organize the Second Conference on Drug Delivery and Translational Research at Polytechnic University (May 2008)
4. President – Tau Beta Pi (2007- 08)
5. President – Omega Chi Epsilon (2006-07)
6. **Hobbies** – Reading, watching Anime and Traveling (Have lived and widely traveled in India, United States and Germany; visited Nepal and Canada)