

Yamini Krishnan

CAMPUS

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PERMANENT

Guru Nivas, Plot No. 55,
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EDUCATION

Bachelor of Technology in Chemical Engineering (May 2013)
Indian Institute of Technology, Bombay, Mumbai, India (CPI: 9.91/10)

ACADEMIC HONORS

- Awarded the '**Shri Rakesh Mathur Excellence award**' for the year 2012 for the highest CPI across all departments at IIT Bombay
- **Ranked 1st** (among 104 students) in the Department of Chemical Engineering, IIT Bombay
- Received the **AP grade** (awarded for outstanding performance) in:
 - Process Fluid Mechanics
 - Fundamentals of Heat and Mass Transfer
 - Thermodynamics
 - Solid Mechanics
 - Complex Analysis
 - Economics
 - Chemistry Lab
- Stood 1st in the twin cities of Hyderabad and Secunderabad in AISSCE 2009 (All India Senior Secondary Certificate Exam)
- Received the **Merit Certificate** (awarded to the top 0.1% students) for Chemistry in AISSCE 2009

RESEARCH EXPERIENCE

Undergraduate Thesis (ongoing)
Advisors: Prof. Ganesh Viswanathan and Prof. Sameer Jadhav
Department of Chemical Engineering, IIT Bombay

Formulated model for the pattern formation of the eggshell during oogenesis of *Drosophila melanogaster*. Performed dynamic simulations and linear stability analysis on the same.

Summer Internship, 2012 (May '12 – July '12)
Absolute calibration of small angle X-ray scattering (SAXS) instrument
Advisor: Prof. Scott Fogler
University of Michigan, Ann Arbor, Michigan, USA

Absolute calibration relates the measured (SAXS) intensity to the differential cross section of the sample. It is rarely carried out on lab scale instruments and results obtained are generally reported in arbitrary units. However, it is important as it allows us to extract quantitative information specific to the structure of the particles (such as molecular mass, specific surface and the presence of aggregation in the system). It is also necessary if to compare the results obtained from different scattering techniques need to be compared.

- Derived the equation and developed the technique for the absolute calibration of a lab scale SAXS instrument (Bruker Nanostar)
- Performed X-ray scattering experiments and standardized the intensity data to an absolute scale using the equation
- Verified the equation by comparing the absolute scale data with the results obtained from neutron scattering

As a second project, I worked on developing example problems for the third edition of the book 'Strategies for Creative Problem Solving' by Prof. Scott Fogler and Prof. Steven LeBlanc.

Summer Internship, 2011

(May '11 – July '11)

Effect of counter ions' valence on head group area of an extended surfactant

Advisor: Dr. Deeleep Rout, Expertise Area Leader–Product Microstructure and Workstream Leader–Superior Cleaning Systems at Unilever Hindustan Unilever R&D Center, Bangalore, India

Extended surfactants contain intermediate polarity linkage groups between the head and the tail groups. Due to this, they can achieve ultra low interfacial tensions for various oil–water systems.

- Conducted experiments to study the effect of valence of counter ions on the head group area of an extended surfactant belonging to the Alfoterra group
- Compared the results obtained with those available in literature for similar extended surfactants
- Learned to use two sophisticated instruments (the Spinning Drop Tensiometer and the Kruss K12 Processor Tensiometer), used to measure interfacial tension

Undergraduate Research Award (URA 01)

(Jan '10-Apr '10)

Advisors:

Prof. Sanjay Mahajani (Dept. of Chemical Engg., IIT Bombay) and Prof. Anuradda Ganesh (Dept. of Energy Science and Engg., IIT Bombay)

- Conducted a comprehensive literature search on the gasification and pyrolysis of Biomass
- Performed vacuum pyrolysis experiments on sawdust to study the impact of different operating conditions on the yield of biodiesel

Indo – German Winter Academy

(Dec '11)

Advisor: Prof Franz Durst

FAU Erlangen & FMP Technology GmbH

Delivered a seminar talk on 'The Extended Navier Stokes Equations'. The conventional Navier Stokes equations do not correctly predict low Knudsen number flows and require the introduction of a slip boundary condition. By including a diffusion term in the continuity equation, The Extended NSEs eliminate the need for the slip boundary condition and can predict low Knudsen number flows using the usual no slip boundary condition

**COURSE
PROJECTS****Biomedical Microsystems**

(Spring '11)

Guide: Prof. R. Srivastava, Dept. of Biosciences and Bioengineering

Designed a micro-interferometer for the detection of prostate cancer based on total PSA (Prostate Sensitive Antigen) levels in human blood serum samples

Bioprocess Principles

(Spring '11)

Guide: Prof. Sarika Mehra, Dept. of Chemical Engineering

- Performed a literature search on the synthesis of different antibiotics
- Determined the overall black box model, calculated the NADH/NADPH requirement, the maximum theoretical yield and the intracellular fluxes of the primary pathways for the biosynthesis of Clavulanic Acid

Molecular and Statistical Thermodynamics

(Spring '10)

Guide: Prof. Jhumpa Adhikari, Dept. of Chemical Engineering

Simulated 1-D Ising model using the demon algorithm (a Monte Carlo method)

**TECHNICAL
SKILLS****Softwares:** C/C++, MATLAB, Scilab, Aspen Plus, Polymath, Fluent**Instruments:** Bruker Nanostar (for small angle X-ray scattering), Spinning Drop Tensiometer, and Kruss K12 Processor Tensiometer**RELEVANT
COURSES**

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|---------------------------|----------------------------------|
| • Analytical Biochemistry | • Computational Fluid Dynamics |
| • Biomedical Microsystems | • Molecular and Cellular Biology |
| • Bioprocess Principles | • Physiology for Engineers |