SRESHTHA SINHA MAJUMDAR

Postdoctoral Research Associate at Oak Ridge National Laboratory sinhamajumds@ornl.gov
Fuels, Engines, and Emissions Research Center (FEERC) 865-946-1293

SKILL SUMMARY

- Expertise in catalyst synthesis, Gas Chromatography (**GC**), Mass Spectrometry (**MS**), X-ray Diffraction (**XRD**), X-ray Photoelectron Spectroscopy (**XPS**), Scanning Electron Microscopy **(SEM)**, Infra-red (**IR**) spectroscopy and Electron Paramagnetic Resonance **(EPR)** techniques
- Experienced in experimental research for design and development of catalytic reactors
- Excellent problem-solving skills with extensive equipment trouble-shooting experience
- Ability to work independently as well as in a team with 3+ years industry experience as an effective team player

EDUCATION

Doctor of Philosophy (Ph.D.)	Chemical Engineering	The Ohio State University	December 2016
Bachelor of Engineering (B.E)	Chemical Engineering	University of Mumbai	2007

RESEARCH EXPERIENCE

Department of Chemical and Biomolecular Engineering, The Ohio State University (2011- 2016)
Heterogeneous Catalysis Research Group, Ph.D. Advisor: Prof. Umit S. Ozkan
Graduate Associate (September 2011- August 2016)
Dissertation Title: "**Catalytic Reduction of Nitrogen Oxide Emissions with Lower Hydrocarbons for Natural Gas-fired Lean-burn Engines"**

- **Collaborated with Caterpillar Inc.** on the development of an aftertreatment system for lean-burn engines
- **Spearheaded the Catalytic Emission Control team** by designing experimental plans with estimated timelines, performing experiments, analyzing data and achieving the annual targets of the NO_x reduction project
- **Enhanced the sulfur tolerance and hydrothermal stability** of the catalytic system by synthesizing robust emission control catalysts using sol-gel and wet impregnation techniques, optimizing the composition of the catalyst bed and conducting time-on-stream activity tests under simulated engine-exhaust conditions to investigate the performance of the catalytic reactor
- **Developed a catalytically active wash-coat** by incorporating different binders into the catalyst for improving the adhesive properties of the powdered catalyst, investigating the effect of binder addition on the catalytic activity for NO_x reduction and tailoring the wash-coat preparation method to further improve the efficiency of the aftertreatment catalytic scheme
- **Established a process for wash-coating cordierite monolith cores** that retains the catalytic properties of the wash-coat for NO_x reduction under lean conditions with improved adhesion to the walls of the monolith core
- **Designed and built reactor systems** to conduct activity tests and kinetic studies on catalysts and to perform specific characterization tests for understanding the properties of the catalyst
- **Troubleshot, repaired and maintained** the Chemiluminescence NO-NO_2-NO_x Analyzer, Gas Chromatograph, Quadrupole Mass Spectrometer, Gas Chromatograph-Mass Spectrometer (GC-MS), Automated Characterization Instrument, Surface Area and Porosimetry Analyzer to facilitate laboratory operations

INDUSTRY EXPERIENCE

Johnson Matthey Chemicals India Pvt. Ltd. **2009-2010** **Sales and Marketing** **Sales Officer**
(Platinum Group Metal Catalyst Division)

- Contributed to new business development by analyzing customer requirements and coordinating with the research and development team for sending appropriate samples to the customer's laboratory on the basis of the type of reaction, process conditions, solvents being used and poisons present
- Managed customer accounts by coordinating with various departments for planning, scheduling and production of catalysts as per customer requirements

Wipro Technologies Ltd. **2007-2009** **Testing Services** **Project Engineer**

- Developed scripts to test various modules on the SAP platform to ensure seamless functionality and operation at the BP Offshore Development Center in the Energy and Utilities vertical.
- Developed critical workflows on the Oracle platform for testing at the SuperValu Offshore Development Center

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LEADERSHIP EXPERIENCE

Primary Safety Officer, Ozkan Laboratory (2014- 2016)

- Supervised and enforced laboratory safety practices within the research group of 16+ members
- Trained new members and educated them about the safety protocols in the research group
- Conducted annual safety seminars in the research group to create general awareness about safety and emergency procedures
- Maintained and updated the Chemical Hygiene Plan (CHP) for annual audits by Environmental Health and Safety (EHS)

Chemical Hygiene Committee (ChyComm) Representative (2014- 2016)

- Resolved safety issues in the department by discussing and implementing possible solutions in collaboration with representatives from other research groups in the Department of Chemical and Biomolecular Engineering
- Coordinated with the ChyComm Faculty Representative and Building Facilities Manager to involve the departmental staff in solving issues related to safety
- Conducted safety seminars to facilitate discussions about safe laboratory practices which were adopted by other laboratory groups in the department

Academic Officer, **Chemical Engineering Graduate Student Council (2014- 2015)**

- Facilitated a forum for interaction between the graduate students and faculty by hosting departmental events
- Organized the Graduate Research Initiative Seminars (GRIP) for graduate students to present their research

TEACHING EXPERIENCE

Teaching Assistant, Department of Chemical and Biomolecular Engineering, OSU (2012- 2016)

Assisted the instructor with course material for:

- Chemical and Biomolecular Engineering (CBE) Unit Operations (Reaction Kinetics)
- Chemical Process Dynamics and Control
- Separation Processes
- CBE Process Design and Development

Research Mentorship, Department of Chemical and Biomolecular Engineering, OSU (2012- 2016)

- Mentored and trained two graduate researchers and four undergraduate researchers on catalyst preparation, catalyst characterization techniques and activity testing
- Counseled undergraduate researchers during their honors thesis program

Visiting Faculty, Department of Chemical Engineering, D.J. Sanghvi College of Engineering, University of Mumbai (2011)

- Taught a course on Material Science and Technology and organized quizzes and class presentations to facilitate an interactive learning environment
- Organized and conducted the Mass Transfer Operations and Fluid Mechanics laboratory courses

AWARDS

- **Kokes Award**, 24th North American Catalysis meeting, Pittsburgh (June 2015)
- **2016 Dean's List Certificate** to Ozkan Group for perfect score on EHS safety inspection (2016)
- **Best Safety Practices Award** (2015) and (2016) to Ozkan Group as Primary Safety Officer (2014-2016)

PUBLICATIONS

"Incorporation of binder during sol-gel preparation of Pd-based sulfated zirconia for reduction of nitrogen oxides under lean-burn conditions: Effect on activity and wash-coating characteristics", **S. S. Majumdar**, G. Celik, A.-M. Alexander, P. Gawade, U.S. Ozkan: Applied Catalysis B: Environmental, 202 (2017), 134-146.

"Investigation of the effect of alumina binder addition to Pd/SO_4^{2-}-ZrO_2 catalysts during sol-gel synthesis", **S. S. Majumdar**, G. Celik, U.S. Ozkan: Industrial & Engineering Chemistry Research, 55 (2016), 11445-11457.

"Sulfur tolerance of the dual-catalyst aftertreatment system for NO_x reduction under lean conditions", **S. S. Majumdar**, A.-M. Alexander, P. Gawade, G. Celik, U.S. Ozkan: Manuscript in progress

SELECTED CONFERENCES

Oral presentation	24th North American Catalysis Society Meeting (NAM)	Pittsburgh, June 14th-19th 2015
Oral presentation	3rd Annual Graduate Research Symposium	Columbus, September 22nd 2014
Oral presentation	Tri-State Catalysis Society Symposium	Louisville, September 15th 2014