

Nameera Baig

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Education

University of Notre Dame Notre Dame, IN
Ph.D. in Analytical Chemistry February 2017
Dissertation Title: Molecular Imaging of Bacterial Communities of the Opportunistic Human Pathogen *Pseudomonas aeruginosa*

University of Houston-Downtown Houston, TX
B.S. in Chemistry, Minor in Applied Mathematics May 2012

Research Experience

Lawrence Berkeley National Laboratory Berkeley, CA
Postdoctoral Researcher October 2018-Present

- Studying microbial adaptation to the soil rhizosphere using techniques in microbiology and molecular biology

E. & J. Gallo Winery Modesto, CA
Postdoctoral Researcher March 2017-September 2018

- Leading the development of methods for rapid detection and characterization of wine spoilage microorganisms using Raman spectroscopy, surface enhanced Raman spectroscopy and chemometrics
- Employing liquid chromatography-mass spectrometry for the detection and quantitation of amino acids in wine

University of Notre Dame Notre Dame, IN
Ph.D. Researcher June 2012-February 2017

- Studied mechanisms involved in the formation and growth of biofilms of the opportunistic human pathogen *Pseudomonas aeruginosa* at the molecular level through the characterization of secreted metabolites and signaling molecules using confocal Raman microscopy and statistical tools like principal component analysis
- Designed and implemented methods for studying bacterial communities using mass spectrometry imaging and Raman microscopy in conjunction with traditional microbiological procedures

University of Houston-Downtown Houston, TX
Undergraduate Research Assistant January 2009-May 2012

- Explored the potential of redox active dyes as pH sensors and developed unique anchoring techniques for fabricating effective sensors for biologically relevant analytes using ionomer/carbon composite
- Studied effects of carbon nanotubes on the properties of urethane acrylate oligomers using dynamic mechanical analysis, differential scanning calorimetry and rheology

Technical University of Łódź Łódź, Poland
Summer Undergraduate Researcher July 2009

- Used Raman spectroscopy for studying mixtures comprised of *N,N*-dimethylacetamide, lithium chloride and water as a solvent system for making hydrogels

Teaching Experience

University of Notre Dame Notre Dame, IN
Chemistry Department Teaching Assistant for General Chemistry labs Aug 2012-May 2013

- Supervised undergraduate students in learning safe laboratory practices and graded lab reports and quizzes

University of Houston-Downtown Houston, TX
Supplemental Instruction Leader and Peer Tutor Aug 2009-May 2012

- Served as a supplemental instruction leader and peer tutor for beginning algebra, college algebra, biology and physical chemistry. Drafted exam reviews and held regular office hours and study sessions to help students with homework

Leadership

University of Notre Dame

Secretary of Optics & Photonics Society (SPIE) Notre Dame Student Chapter

- Participated in organizing community outreach events and group activities

Notre Dame, IN
August 2015-October 2016

University of Houston-Downtown

Peer Mentor with the Scholars' Academy

- Mentored undergraduate students majoring in the natural sciences
- Organized community outreach events and group activities

Houston, TX
Aug 2010-May 2012

Publications

- **Baig, N. F.**, Dunham, S. J., Morales-Soto, N., Shrout, J. D., Sweedler, J. V., & Bohn, P. W. (2015). Multimodal chemical imaging of molecular messengers in emerging *Pseudomonas aeruginosa* bacterial communities. *Analyst*, 140(19), 6544-6552
- Poliseti, S., **Baig, N.**, Bible, A., Morrell-Falvey, J., Doktycz, M., & Bohn, P. W. (2015, August). Using Raman spectroscopy and SERS for in situ studies of rhizosphere bacteria. Proc. SPIE 9550, Biosensing and Nanomedicine VIII, 95500D
- Dunham, S. J., Comi, T. J., Ko, K., Li, B., **Baig, N. F.**, Morales-Soto, N., Shrout, J.D., Bohn, P.W. & Sweedler, J. V. (2016). Metal-assisted polyatomic SIMS and laser desorption/ionization for enhanced small molecule imaging of bacterial biofilms. *Biointerphases*, 11(2), 02A325
- **Baig, N.F.**, Poliseti, S., Morales-Soto, N., Dunham, S.J.B., Sweedler, J.V., Shrout, J.D., Bohn, P.W. (2016, September). Label-free molecular imaging of bacterial communities of the opportunistic pathogen *Pseudomonas aeruginosa*. Proc. SPIE 9930, Biosensing and Nanomedicine IX, 993004
- **Baig, N. F.**, Poliseti, S., Morales-Soto, N., Shrout, J. D., & Bohn, P. W. (2017). Spatial Mapping of Pyocyanin in *Pseudomonas aeruginosa* Bacterial Communities Using Surface Enhanced Raman Scattering. *Applied Spectroscopy*, 71(2), 215-223
- Morales-Soto, N., Dunham, S.J.B., **Baig, N.F.**, Ellis, J.F., Madukoma, C.S., Bohn, P.W., Sweedler, J.V., Shrout, J.D. (2018). Spatially-dependent alkyl quinolone signaling responses to antibiotics in *Pseudomonas aeruginosa* swarms. *Journal of Biological Chemistry*, 293 (24), 9544-9552
- Dunham, S.J.B., Ellis, J.F., **Baig, N.F.**, Morales-Soto, N., Cao, T., Shrout, J.D., Bohn, P.W., Sweedler, J.V. (2018). Quantitative SIMS Imaging of Agar-Based Microbial Communities. *Journal of Analytical Chemistry*, 90 (9), 5654-5663
- Ma, C., Fu, K., Trujillo, M., Gu, X., **Baig, N.F.**, Bohn, P.W., Camden, J. (2018). In-Situ Probing of Laser Annealing of Plasmonic Substrates with Surface-Enhanced Raman Spectroscopy. *Journal of Physical Chemistry C*, 122 (20), 11031-11037
- Morales-Soto, N., Cao, T., **Baig, N.F.**, Kramer, K.M., Bohn, P.W., Shrout, J.D. (2018). Surface growing communities of *Pseudomonas aeruginosa* exhibit distinct alkyl quinolone signatures. *Microbial Insights*, 11, 1178636118817738
- Cao, T., Morales-Soto, N., Jia, J., **Baig, N.F.**, Dunham, S.J.B., Ellis, J.F., Sweedler, J.V., Shrout, J.D., Bohn, P.W. (2019, March). Spatiotemporal dynamics of molecular messaging in bacterial co-cultures studied by multimodal chemical imaging. Proc. SPIE 10863, Photonic Diagnosis and Treatment of Infections and Inflammatory Diseases II, 108630A

Selected Presentations

- "Shining Light on the Secret Lives of Microbes: My Journey from Undergraduate Research to Industry." (Keynote Address), Student Research Conference, University of Houston-Downtown, April 2018
- "Molecular Imaging of Chemically Communicating Bacterial Communities of the Opportunistic Pathogen *Pseudomonas aeruginosa*." (Oral Presentation), SciX Conference, Minneapolis MN, September 2016
- "Label-free molecular imaging of bacterial communities of the opportunistic pathogen *Pseudomonas aeruginosa*." (Oral Presentation) SPIE Optics+Photonics Conference, San Diego CA, August 2016
- "Multimodal Molecular Imaging of Chemically Communicating Bacterial Communities." (Poster) SciX Conference, Providence RI, September 2015
- "Label-Free Molecular Imaging of Clinically Relevant, Chemically Communicating Microbial Communities." (Poster) Turkey Run Analytical Conference, Marshall IN, November 2014
- "Label-Free Molecular Imaging of Chemically Communicating Microbial Communities." (Poster) MUACC, Notre Dame IN, October 2013
- "A Simple Process for Preparing Low Viscosity Diacrylate-Functional Epoxy Oligomers." (Oral Presentation) Student Research Conference, University of Houston-Downtown, April 2012.
- "Novel Dye Based pH Sensor to Supplement Commercial Glass Probe." (Poster) SACNAS conference, San Jose California, October 2011

- “New pH Sensor for Strong Acidity Detection Based on Ionomer/Carbon Nanocomposite Thin Film. (Oral Presentation) Rice University Regional Undergraduate Chemistry Symposium, Houston Texas, 2010

Selected Awards and Honors

- Berry Family Foundation Graduate Fellowship in Advanced Diagnostics and Therapeutics, University of Notre Dame, 2016-2017
- Excellence in Inorganic Chemistry Award, University of Houston-Downtown, 2012
- Dr. Barry S. Garret Scholarship for academic excellence, University of Houston-Downtown 2011–2012
- Excellence in Chemistry Award, University of Houston-Downtown, 2011
- Red Rose Leadership Scholarship, University of Houston-Downtown, 2010 – 2012
- Brown Foundation Leadership Scholarship, University of Houston-Downtown 2010–2011
- Excellence in Freshman Chemistry Award, University of Houston-Downtown, 2009
- National Balshree honor for excellence in creative writing, Ministry for Human Resource Development Government of India, 2004