NISHIT SHETTY

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EDUCATION

Washington University in Saint Louis, U.S. 2016-2021
Ph. D., *Energy, Environmental and Chemical Engineering (EECE)*
Dissertation: *Identifying and resolving artifacts associated with the measurement and characterization of light absorbing organic aerosols.*
Advisor: *Rajan K. Chakrabarty*

Indian Institute of Technology (IIT) Gandhinagar, India 2012-2016
B. Tech. (Honors), Chemical Engineering

RESEARCH EXPERIENCE

Postdoctoral Associate, Virginia Tech, U.S., Advisor: *Prof. Linsey Marr* 2022 - present
Developing instrumentation for sampling infectious influenza virus in aerosols and fomites. Studying the contribution of different mechanisms responsible for transmission of influenza.

Postdoctoral Fellow, Washington University in St. Louis, U.S., 2021-2022
Advisors: *Prof. John Cirrito and Prof. Rajan Chakrabarty*
Developed a breathalyzer to detect SARS-CoV-2 virus particles. The breathalyzer was tested successfully with all variants of the virus up to BA.1.

Graduate Research Assistant, Washington University in St. Louis, U.S., 2016-2021
Advisor: *Prof. Rajan Chakrabarty*
Identified previously underestimated artifacts in the optical characterization of organic aerosols – associated with low volatility organics.
Determined the complex refractive index and optical properties of organic emissions from real-world wildfires and characterized them as a function of the combustion conditions.

Research Intern, Washington University in St. Louis, U.S., Advisor: *Prof. Pratim Biswas* 2015
Generated and characterized calcium carbonate nanoparticles using sol-gel methods and tested their efficacy as antacids.

Undergraduate Researcher, IIT Gandhinagar, India, Advisor: *Prof. Sameer Dalvi* 2015-2016
Studied the polymorphic behavior of Carbamazepine -a water insoluble drug- and characterized the conditions required for precipitation of different polymorphs of the drug.

Research Intern, IIT Gandhinagar, India, Advisor: *Prof. Pratyush Dayal* 2014
Developed a model to simulate the kinetics and mechanical properties of shape-memory polymers as part of the summer research internship program (SRIP). The results were presented as a poster at the end of the SRIP.

RESEARCH SKILLS

Aerosol optics measurement: Multi-wavelength photoacoustic spectroscopy, nephelometry, static light scattering, ultraviolet-visible spectrophotometry

Physical characterization techniques: Scanning Mobility Particle Sizer, Centrifugal Particle Mass Analyzer, Aerodynamic Aerosol Classifier, Multi-stage Impactor, scanning and transmission electron microscopy

Additional instrumentation and experimental skills: Bioaerosol generation (Collison) and suspension (Golberg drum), chamber studies, total organic carbon analysis, thermodenuders, Liquid Spot Sampler

Computational: Aerosol particle aggregation and kinetics modeling, stochastic process modeling (Monte Carlo), particle optics calculation (Mie Theory, Q-space analysis), proficient in Python, MATLAB, and R

JOURNAL PUBLICATIONS

1. Kumar, J., Paik, T., **Shetty, N.**, Sheridan, P., Aiken, A., Dubey, M., & Chakrabarty, R. (2022). Correcting for filter-based aerosol light absorption biases at ARM's SGP site using Photoacoustic data and Machine Learning. Atmospheric Measurement Techniques Discussions, 1-21.
2. **Shetty, N.,** Beeler, P., Paik, T., Brechtel, F. J., & Chakrabarty, R. K. (2021). Bias in quantification of light absorption enhancement of black carbon aerosol coated with low-volatility brown carbon. *Aerosol Science and Technology*.
3. Sumlin, B., Fortner, E., Lambe, A., **Shetty, N.**, Daube, C., ... & Chakrabarty, R. K. (2021). Diel Cycle Impacts on the Chemical and Light Absorption Properties of Organic Carbon Aerosol from Wildfires in the Western United States. *Atmospheric Chemistry and Physics*.
4. **Shetty, N. J**., Pandey, A., Baker, S., Hao, W. M., & Chakrabarty, R. K. (2019). Measuring light absorption by freshly emitted organic aerosols: optical artifacts in traditional solvent-extraction-based methods. *Atmospheric Chemistry and Physics*.
5. Pandey, A., **Shetty, N. J**., & Chakrabarty, R. K. (2019). Aerosol light absorption from optical measurements of PTFE membrane filter samples: sensitivity analysis of optical depth measures. *Atmospheric Measurement Techniques.*
6. Sumlin, B. J., Heinson, Y. W., **Shetty, N.**, Pandey, A., Pattison, R. S., Baker, S., ... & Chakrabarty, R. K. (2018). UV–Vis–IR spectral complex refractive indices and optical properties of brown carbon aerosol from biomass burning. *Journal of Quantitative Spectroscopy and Radiative Transfer*.
7. Raliya, R., Som, A., **Shetty, N**., Reed, N., Achilefu, S., & Biswas, P. (2016). Nano-antacids enhance pH neutralization beyond their bulk counterparts: synthesis and characterization. *RSC advances*.
8. **Shetty, N.**, Thind, A., Zhang, C., Sumlin, B., Adachi, K., Sedlacek, A. J., Mishra, R., & Chakrabarty, R. K. Optical properties and vertical distribution of light-absorbing organic carbon from western United States wildfires. (in preparation)
9. **Shetty, N.**, Liu, P., Liang, Y., Goldstein, A., & Chakrabarty, R. K. Composition and refractive index of brown carbon in aerosol solvent extracts from wildfire emissions in the western United States. (in preparation for Environmental Science and Technology)

CONFERENCE PRESENTATIONS AND POSTERS

1. Atmospheric Optics: Aerosols, Visibility, and the Radiative Balance, Oct 2021: Measuring light absorption by freshly emitted organic aerosols: optical artifacts in traditional solvent-extraction-based methods., (*Oral*)
2. American Association for Aerosol Research 38th Annual Conference, Oct 2020: Imaginary Refractive Index Comparison of Water- and Methanol-soluble Brown Carbon Aerosol from western US Wildfires., (*Oral*)

3. American Association for Aerosol Research 37th Annual Conference, Oct 2019: Biases in Quantifying Light Absorption Enhancement for Coated Black Carbon Aerosol Using a Thermodenuder., (*Oral*)
4. American Association for Aerosol Research 37th Annual Conference, Oct 2019: Toward Development of a Metric to Relate Molecular Characteristics with Optical Properties for Biomass Burning Aerosol., (*Poster*)
5. Xth International Aerosol Conference, Sep 2018: Measuring Light Absorption by Organic Aerosols: Correction Factors for Solvent Extraction Based Photometry Techniques., (*Oral)*
6. Xth International Aerosol Conference, September 2018: Effects of Thermodenuding on the Morphology and Optical Properties of Soot., (*Poster)*
7. American Association for Aerosol Research 36th Annual Conference, Oct 2017: Mass absorption cross section enhancement for water soluble organic carbon from biomass combustion., (*Poster)*

TEACHING EXPERIENCE

Washington University in St. Louis

EECE 301 – Transport Phenomenon I: Basics and Fluid Mechanics — Fall 2017, 2018
(Awarded the **department teaching assistant award** for Fall 2018)

EECE 402 – ChE Capstone — Spring 2018

Indian Institute of Technology Gandhinagar

CL 352 – Chemical Engineering Lab IV — Spring 2016

AWARDS AND HONORS

Travel assistance, Air and waste management association [$1,500]	2021
Aerosol Summer School, PNNL: Sponsored for a summer visit to PNNL [$2,500]	2019
Travel Grant, American Association for Aerosol Research [$500]	2019
Graduate Student Teaching Assistant Award, Washington University in St. Louis [$300]	2019
Top poster contest winner, International Aerosol Conference	2018
Institute's Gold Medal: First rank, Chemical Engineering, IIT Gandhinagar	2016
Award for Undergraduate Publication, IIT Gandhinagar [₹25,000]	2016
Prof. M. H. Divekar scholarship: Awarded for excellence in Chemical Engineering courses, IIT Gandhinagar [₹20,000]	2015-2016
MAGEEP Fellowship, Washington University in St. Louis [$5,000]	2015

MENTORING EXPERIENCE

Joshin Kumar, Ph.D. candidate, Washington University in St. Louis	2021-2022
Dishit Ghumra, Ph.D. candidate, Washington University in St. Louis	2021-2022
Ganesh Chelluboyina, Ph.D. candidate, Washington University in St. Louis	2020-2021
Patrick Wiecko, B.S., Washington University in St. Louis	2020-2021
Esther Koh, M.S., Washington University in St. Louis	2019-2021
Theodore Paik, Ph.D. candidate, Washington University in St. Louis	2019-2021
Akhil Ashar, B.Tech., IIT Gandhinagar	2019

Christopher Walker, B.S., Washington University in St. Louis 2018

PROFESSIONAL ENGAGEMENT & AFFILIATIONS

Reviewer – Optics Express, Aerosol Science and Technology

Session co-chair for Light Absorbing Carbon session, AWMA Visibility Conference 2021

Session co-chair for Aerosol Physics session, International Aerosol Conference 2018

Student member, American Association for Aerosol Research 2017-2021

Student member, American Institute of Chemical Engineers 2013-2016

SOCIAL OUTREACH AND EXTRACURRICULARS

Volunteer, Organized small scale experiments explaining atmospheric processes to middle school students from underprivileged neighborhoods around St. Louis 2018,2019

Volunteer, *Polar-ICE Student Polar Research Symposium,* assessed and provided feedback on posters made by middle school students from schools around the St. Louis area. 2018

Vice President, *Umang*, the Indian graduate student association, organized several Indian cultural events for graduate students, Washington University in St Louis. 2017-2018

Volunteer, *Nyasa*, educated elementary school children from underprivileged backgrounds on basic mathematics and language, IIT Gandhinagar. 2013-2015

Member, *Abhinaya*, the dramatics club, organized and participated in street and stage plays on social issues regarding caste and religious discrimination, IIT Gandhinagar. 2012-2016