Sylvia C. Sullivan

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EDUCATION

PH.D. | 2017 (EXPECTED) | GEORGIA INSTITUTE OF TECHNOLOGY | GPA 3.8/4.0

Major: Chemical Engineering, Minor: Earth and Atmospheric Science

Thesis: Improving the model representation of mixed-phase cloud microphysics

Advisor: Athanasios Nenes

B.S. | JUNE 2012 | CALIFORNIA INSTITUTE OF TECHNOLOGY | GPA 3.4/4.0

Major: Chemical Engineering, Minor: Environmental Science

AWARDS and FELLOWSHIPS

2016 School of Chemical and Biomolecular Engineering Ziegler Award for Best Paper

2013-2016 NASA Earth and Space Science Fellowship: Mixed-Phase Cloud Parameterization in Global Climate Models

2014 JPL Center for Climate Sciences Summer School participant

2014 Alternate candidate, Fulbright fellowship

2013 NCAR Community Earth System Model tutorial participant

2012 Georgia Tech Chemical Engineering Excellence Fellowship

2011 Summer Undergraduate Research Fellowship: Caltech-GIST Exchange Program

2010 Caltech Summer Undergraduate Research Fellowship

2008 AP National Scholar, National Merit Scholar

TEACHING

Coursework: Fundamentals of Teaching and Learning in Higher Education, Teaching Practicum, Course Design for Higher Education in fulfillment of the Tech to Teaching Certification

2016 Co-Instructor for Georgia Tech ChBE4300: Chemical Kinetics & Reactor Design

2014 Teaching Assistant for Georgia Tech ChBE3210: Transport Processes II

2013 Teaching Assistant for Georgia Tech ChBE4300: Chemical Kinetics & Reactor Design

2012 Teaching Assistant for Caltech ChE 10: Introduction to Chemical Engineering

PUBLICATIONS

- 1. <u>S. Sullivan</u>, C. Hoose, and A. Nenes. Investigating the relative contributions of secondary ice formation processes to ice crystal number concentrations (2016) [In preparation].
- 2. Field, P. et al. Chapter 7. Secondary Ice Production current state of the science and recommendations for the future (2016). *AMS Monographs* [In review].
- 3. <u>S. Sullivan</u>, D. Lee, L. Oreopoulos, and A. Nenes. The role of updraft velocity in temporal variability of cloud hydrometeor number (2016). *Proceedings of the National Academy of Science* **113** (21): 5791-5796. doi: 10.1073/pnas.1514039113.
- 4. <u>S. Sullivan</u>, R. Morales, D. Barahona, and A. Nenes. Understanding cirrus ice crystal number variability for different heterogeneous nucleation spectra (2016). *Atmospheric Chemistry and Physics* **16**: 2611-2629. doi: 10.5194/acp-16-2611-2016.
- 5. B. Sheyko, <u>S. Sullivan</u>, R. Morales, S. L. Capps, D. Barahona, X. Shi, X. Liu, and A. Nenes. Quantifying sensitivities of ice crystal number and sources of ice crystal number variability in CAM 5.1 using the

adjoint of a physically-based cirrus formation parameterization (2015). *Journal of Geophysical Research* **120** (7): 2169-8996. doi: 10.1002/2014JD022457

EXPERIENCE

DOCTORAL STUDENT | CHEMICAL AND BIOMOLECULAR ENGINEERING DEPARTMENT GEORGIA INSITUTE OF TECHNOLOGY | AUGUST 2012 - PRESENT

- construction of adjoint sensitivity models for droplet activation and ice nucleation
- comparison of model output ice crystal numbers using different heterogeneous nucleation spectra
- parcel model development for simulation of secondary ice production processes, including droplet shattering, ice hydrometeor breakup upon collision, and rime-splintering

VISITING RESEARCHER | INSTITUT FÜR METEOROLOGIE UND KLIMAFORSCHUNG KARLSRUHER INSTITUT FÜR TECHNOLOGIE

MENTOR: CORINNA HOOSE | JANUARY - JULY 2016

- parameterizations of droplet shattering and ice hydrometeor breakup upon collision within the COSMO regional meteorological model of the German Weather Service

VISITING RESEARCHER | GODDARD SPACE FLIGHT CENTER MENTORS: LAZAROS OREOPOULOS, DONIFAN BARAHONA, DONGMIN LEE | FEBRUARY 2015

- implementation of adjoint sensitivity codes into the NASA Goddard Earth-Observing System Model
- attribution analysis of temporal variability in activated droplet and nucleated ice crystal numbers

RESEARCH STUDENT | LABORATOIRE D'HYDRODYNAMIQUE ÉCOLE POLYTECHNIQUE

MENTOR: LUTZ LESSHAFFT | SEPTEMBER - DECEMBER 2011

- modeling of oceanic turbidity currents in MATLAB and analysis of their stability regimes

SUMMER UNDERGRADUATE RESEARCH FELLOW \mid AIR QUALITY MONITORING LABORATORY GWANGJU INSTITUTE OF TECHNOLOGY

MENTORS: YONG-JOON KIM, JIHYO CHONG | JUNE - AUGUST 2011

- NO_2 mixing ratio measurements using Topographic Target Light scattering Differential Optical Absorption spectroscopy
- statistical analysis of slant column density data in IDL

PRESENTATIONS

1. <u>S. Sullivan</u>, C. Hoose, and A. Nenes. The effect of secondary ice production parameterizations on a simulated cold frontal rainband.

Poster: American Geophysical Union 2016 Annual Meeting: Observations, Modeling, and Effects of Mixed-Phase Clouds, 12-16 December 2016.

2. <u>S. Sullivan</u>, C. Hoose, and A. Nenes. Investigating the relative contributions of secondary ice formation processes to ice crystal number concentrations.

Poster: American Geophysical Union 2015 Annual Meeting: Observations, Modeling, and Effects of Mixed-Phase Clouds, 13-18 December 2015.

Oral: European Geophysical Union 2016 Annual Meeting: Observing and Modeling Processes in Moderately Supercooled Clouds, 18-22 April 2016.

Oral: American Association of Aerosol Research 2016 Annual Conference: Aerosol-Cloud Interactions, October 17-21 2016.

3. <u>S. Sullivan</u> and A. Nenes. The role of updraft velocity in temporal variability of cloud hydrometeor number.

Oral: European Geophysical Union 2016 Annual Meeting: Clouds, Aerosols, Radiation, and Precipitation, 18-22 April 2016.

4. <u>S. Sullivan</u>, B. Sheyko, and A. Nenes. Adjoint Model for the Efficient Calculation of Atmospheric Nucleation Sensitivities.

Poster: American Institute of Chemical Engineers 2014 Annual Meeting: Applied Mathematics and Numerical Analysis, 16-21 November 2014.

Poster: American Meteorological Society 2014 14th Annual Conference on Cloud Physics: Cirrus Clouds, 7-11 July 2014.

Oral: American Association of Aerosol Research 2014 Annual Conference: Aerosol-Cloud Interactions, 20-24 October 2014.

6. <u>Sullivan, S.</u> and L. Lesshafft. "Modélisation des courants de turbidité et analyse de leurs ondes internes (Modeling of turbidity currents and stability analysis of their internal waves)."

LadHyX Projet de Recherche en Laboratoire Final Présentation, 15 December 2011.

LEADERSHIP and MEMBERSHIPS

2014 - present American Geophysical Union and American Meteorological Society member

2014 - 2015 Women in Engineering outreach ambassador

2014, 2015 Chemical and Biomolecular Engineering Graduate Research Symposium, vice chair and chair

2012 NCAA Division III track & field, team captain

2011 Student Faculty Committee for chemical engineering option, student representative

2010 Committee on Exchange Programs and Study Abroad, student representative

2010 – 2012 Student Athletic Advisory Committee, women's track representative

2012 - present American Chemical Society member

SKILLS

Computer: MatLab, Fortran, Unix (Bash and C shells), LaTeX, Mathematica

Language: French (advanced – TCF C1 level); German (intermediate – GZ B2 level)

Athletics: Middle- and long-distance running, triathlons

Caltech women's track & field record holder, Atlanta Track Club, 2013 and 2014 USAT Age Group

Championships qualifier

Music: Classical piano