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## RESEARCH INTERESTS

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- Climate response to short-lived vs. long-lived climate forcers; associated mitigation co-benefits; synergies and conflicts between climate and air quality policy
- Climate modeling of regional and global climate effects of anthropogenic aerosols; spatial patterns of climate response to evolving short-lived forcing; impacts on extremes and rates of change

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## EDUCATION

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### Princeton University, Princeton, NJ.

*Ph.D.*, Atmospheric and Oceanic Science

*May 2016*

Advisors: Drs. V. Ramaswamy and Yi Ming.

Dissertation: “Climate Implications of the Heterogeneity of Anthropogenic Aerosol Forcing”

*Certificate* in Science, Technology, and Environmental Policy

*May 2016*

Advisor: Dr. Michael Oppenheimer.

Project: “Trade and the Future of China’s Black Carbon Emissions”

**Stanford University**, Stanford, CA., *B.S.* with Departmental Honors, Geophysics

*June 2010*

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## PEER-REVIEWED PUBLICATIONS

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**Persad, G. G.**, D. Paynter, Y. Ming, and V. Ramaswamy, 2017: Competing Atmospheric- and Surface-Driven Impacts of Absorbing Aerosols on the East Asian Summertime Climate. *J. Climate*. doi: 10.1175/JCLI-D-16-0860.1

**Persad, G. G.**, Y. Ming, and V. Ramaswamy, 2014: The Role of Aerosol Absorption in Driving Solar Dimming over East Asia. *J. Geophys. Res. Atmos.*, 119, 410–20. doi: 10.1002/2014JD021577.

**Persad, G. G.**, Y. Ming, and V. Ramaswamy, 2012: Tropical Troposphere-Only Responses to Absorbing Aerosols. *J. Climate*, 25, 2471–2480. doi: 10.1175/JCLI-D-11-00122.1

Ming, Y., V. Ramaswamy, and **G. Persad**, 2010: Two Opposing Effects of Absorbing Aerosols on Global-mean Precipitation. *Geophys. Res. Lett.*, 37, L13701. doi: 10.1029/2010GL042895.

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## MANUSCRIPTS IN REVIEW AND IN PREPARATION

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**Persad, G.G.** and K. Caldeira, 2017: Divergent Global-Scale Temperature Effects from Identical Aerosols Emitted in Different Regions. *In Review*.

**Persad, G. G.**, Y. Ming, Z. Shen, and V. Ramaswamy, 2017: Spatially Similar Surface Energy Flux Perturbations due to Greenhouse Gases and Aerosols. *In Review*.

Praetorius, S., M. Rugenstein, **G. G. Persad**, and K. Caldeira, 2017: North Pacific surface ocean heat fluxes enhance Arctic warming. *In Review*.

**Persad, G. G.**, V. Naik, and M. Oppenheimer: Trade and the Future of China’s Black Carbon Emissions. *In Preparation*.

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## OTHER PUBLICATIONS

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Christian-Smith, J., T. Moran, **G. G. Persad**, G. Smith, and L. Szeptycki. “Navigating a Flood of Information: Evaluating and Integrating Climate Science into Groundwater Planning in California.” Union of Concerned Scientists, 2017.

## RESEARCH AND PROFESSIONAL EXPERIENCE

- Postdoctoral Research Scientist.** Carnegie Institution for Science. Stanford, CA. *2016-present*  
Caldeira Lab, Dept. of Global Ecology. Developing new research program to analyze the influence of anthropogenic aerosols' geographic distribution on patterns of global climate change.
- Science, Tech., and Env. Policy Fellow.** Princeton University. Princeton, NJ *2012-16*  
 PI: Dr. Michael Oppenheimer. Evaluated implications of China's black carbon embodied in trade using mathematical, global climate, and integrated assessment modeling.
- NSF Graduate Research Fellow.** Princeton University. Princeton, NJ. *2011-16*  
 PIs: Drs. V. Ramaswamy and Yi Ming. Investigated the impact of anthropogenic aerosol emissions on regional and global climate using global climate models.
- Physical Scientist.** NOAA/Geophysical Fluid Dynamics Lab (GFDL). Princeton, NJ. *2010-11*  
Atmospheric Physics and Chemistry Group. Analyzed aerosols' impact on the surface energy balance, regional precipitation, and cloud properties. Contributed internal peer review to Group projects and represented NOAA at international conferences.
- Hollings Research Fellow.** NOAA/GFDL. Princeton, NJ. *Summer 2009*  
 PI: Dr. Yi Ming. Analyzed the cloud interactions responsible for black carbon aerosol's radiative impact in global climate models.
- DOE Research Fellow.** Lawrence Berkeley National Laboratory. Berkeley, CA. *Summer 2008*  
 PI: Dr. Surabi Menon. Assessed the fidelity of aerosol/cloud interactions in global climate models using satellite data.

## SELECTED RESEARCH GRANTS AND EXTERNAL FUNDING AWARDS

- NSF CNH-L #1715557 "The coupled climate and institutional dynamics of short-lived local pollutants and long-lived global greenhouse gases"** *2017-21*  
 National Science Foundation ( Co-PI: \$319,970 subaward; \$1,500,000 total award)
- Ford Science, Technology, and Environmental Policy Fellowship** *2013-16*  
 Princeton Environmental Institute (\$49,705)
- Graduate Research Fellowship,** National Science Foundation (\$131,000) *2012-16*
- Science To Achieve Results Fellowship** (*Declined*), Env. Protection Agency (\$126,000) *2012-15*
- Graduate/Industry Fellowship,** American Meteorological Society (\$25,000) *2011-12*
- Centennial Fellowship,** Princeton University Graduate School (\$65,540) *2011-15*
- Ernest F. Hollings Scholarship,** Nat'l Oceanic & Atmospheric Administration (\$28,000) *2008-10*

## SELECTED ADDITIONAL HONORS

- Rising Environmental Leader,** Woods Institute for the Environment, Stanford University *2016*
- Student Oral Presentation Award,** American Meteorological Society 95<sup>th</sup> Annual Meeting *2015*
- Outstanding Student Paper Awards,** American Geophysical Union Fall Meeting *2013, 2014*
- 1<sup>st</sup> Place Grad. Student Poster Presentation,** Amer. Met. Soc. 92<sup>nd</sup> Annual Meeting *2012*
- Kennedy Prize:** awarded to Stanford's top undergraduate science thesis university-wide *2010*
- Firestone Medal** for excellence in undergraduate research, Stanford University *2010*
- Dean's Award** for undergraduate academic achievement, Stanford School of Earth Sciences *2010*

## TEACHING, MENTORSHIP, AND OUTREACH EXPERIENCE

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### TEACHING

*Stanford University*

**SLS 805X: Evaluation of Water Planning and Climate Science in California,** *Spring 2017*

Instructional Team (1 of 4)

Developed and taught lectures on climate modeling and climate change science related to water resources; contributed to design of course content and assignments; provided student guidance and feedback on work.

*Princeton University*

**GEO 197: Environmental Decision-Making,** Assistant in Instruction *Fall 2014*

Developed and implemented in-class activities and assignments, graded assignments, assisted in the preparation and grading of exams, developed final grading rubric.

**AOS 577: Mid-latitude Circulation Systems Seminar,** Co-organizer/Lecturer *Summer 2014*

Created curriculum based on retired course, coordinated student lecturers, and delivered lectures.

**WWS 585b: Living in a Greenhouse: Technology and Policy,** Guest Lecturer *Fall 2012, 2013*

Developed and delivered lecture on aerosols, provided advising on integration of aerosol science into course material for public policy and engineering students.

### FORMAL ADVISING AND MENTORSHIP

**Research Advisor** – Pranay Nadella, High School Intern, NOAA/GFDL

**Research Mentor** – Michelle Frazer, Hollings Undergraduate Intern, NOAA/GFDL

**PWiGs Mentor** – Emma Kast, Graduate Student, Princeton Univ. Dept. of Geosciences

### OUTREACH

**California Academy of Sciences:** Mentor, 2016 Youth Careers in Science Program; Expert Scientist, 2015 and 2016 Science Game Jams

**Alliance for Climate Education:** Science Friday lecturer – “Atmospheric Aerosols: What They Are and Why/How We Study Them.”; Guest Blogger, *Hot and Bothered* online blog

**Princeton Energy and Climate Scholars:** Science Outreach Coordinator, events for Princeton Day School (Princeton, NJ), Princeton University Splash, North Star Academy (Newark, NJ), and Rutland High School (Rutland, Vermont)

## PROFESSIONAL ACTIVITIES AND SERVICE

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### SCIENTIFIC

**Session Co-Chair**, American Meteorological Society Annual Meeting *2018*

“Aerosols, Clouds and Climate”, 31st Conference on Climate Variability and Change

**Review Panelist**, National Science Foundation, Division of Atmos. and Geo. Sciences *2017*

**Session Co-convenor and Chair**, American Geophysical Union Fall Meeting *2015, 2016*

“Atmospheric Circulation and Hydrological Cycle Under a Changing Climate”

“Climate Change is a Cross-Disciplinary Challenge: Disciplinary Advances in an Accessible Framework.”

**Chair**, 2015 Gordon Research Seminar on Radiation and Climate *2013-15*

**Reviewer**, *Climate Dynamics*, *Journal of Climate*, *Geophys. Res. Letters*, *J. Geophys. Res.*, *PLOS One* *Ongoing*

### DIVERSITY AND UNIVERSITY SERVICE

**Cofounder/Organizer**, Princeton Women in Geosciences (PWiGs) Initiative *2013-15*

**Resident Graduate Student**, Butler College, Princeton University *2012-15*

**Council Member**, Princeton University Women in STEM Leadership Council *2013-14*

**Department Representative**, Princeton Graduate Student Government *2013-14*

## SELECTED INVITED TALKS

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- Persad G.,** 2016: Exploring the Climate Implications of Aerosol Forcing's Spatial Heterogeneity. *Lawrence Livermore National Laboratory*. Livermore, CA.  
*Lawrence Berkeley National Laboratory*. Berkeley, CA.
- Persad, G.,** 2015: Black Carbon Aerosol: The Hare to Carbon Dioxide's Tortoise. *University of Texas at Austin, Jackson School of Geosciences Climate Forum*. Austin, TX.
- Persad, G.,** Y. Ming (presenter), and V. Ramaswamy, 2014: The Role of Aerosol Absorption in Solar Dimming over East Asia and Its Implications for Regional Climate. *European Geosciences Union General Assembly*, Vienna, Austria.
- Persad, G.,** 2011: General Circulation Modeling of Black Carbon: Climate Forcing, Challenges, and Insights from GFDL's AM2.1 Model. *4<sup>th</sup> International Training School on Atmospheric Brown Cloud*, Kathmandu, Nepal.

## CONFERENCE ABSTRACTS

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<sup>°</sup> Oral; <sup>+</sup>Poster; <sup>‡</sup> Recognized by award

- Persad, G.** and K. Caldeira, 2017: The Influence of Aerosol Emissions' Geographic Location on the Magnitude and Spatial Distribution of Climate Effects. *American Geophysical Union Fall Meeting*, New Orleans, LA. <sup>°</sup>
- Persad, G.** and K. Caldeira, 2017: The Influence of Aerosol Emissions' Geographic Location on the Magnitude and Spatial Distribution of Climate Effects. *Gordon Research Seminar<sup>°</sup> and Conference<sup>+</sup> on Radiation and Climate*. Lewiston, ME.
- Persad, G.,** V. Niak, and M. Oppenheimer, 2016: Trade and the Future of China's Black Carbon Emissions. *American Geophysical Union Fall Meeting*, San Francisco, CA. <sup>°</sup>
- Persad, G.,** D. Paynter, Y. Ming, and V. Ramaswamy, 2015: Competing Atmosphere- and Surface-Driven Impacts of Aerosol Absorption on the East Asian Summer Monsoon. *American Geophysical Union Fall Meeting*, San Francisco, CA. <sup>+</sup>
- Persad, G.,** D. Paynter, Y. Ming, and V. Ramaswamy, 2015: The Regional Climate Response to Absorption-Driven Solar Dimming over East Asia. *Gordon Research Conference on Radiation and Climate*. Waterville, ME. <sup>+</sup>
- Persad, G.,** D. Paynter, Y. Ming, and V. Ramaswamy, 2015: The Regional Climate Response to Absorption-Driven Solar Dimming over East Asia. *27<sup>th</sup> Conference on Climate Variability and Change at 95<sup>th</sup> AMS Annual Meeting*, Phoenix, AZ. <sup>°‡</sup>
- Persad, G.,** Y. Ming, and V. Ramaswamy, 2014: Similarities in the Spatial Pattern of the Surface Flux Response to Present-Day Greenhouse Gases and Aerosols. *American Geophysical Union Fall Meetings*, San Francisco, CA. <sup>° ‡</sup>
- Persad, G.,** Y. Ming, and V. Ramaswamy, 2013: The Role of Aerosol Absorption in Solar Dimming over East Asia and Its Implications for Regional Climate. *American Geophysical Union Fall Meeting*, San Francisco, CA. <sup>° ‡</sup>
- Persad, G.,** Y. Ming, and V. Ramaswamy, 2013: Aerosol Direct Radiative Effects through the Lens of East Asian Solar Dimming. *Gordon Research Conference on Radiation & Climate*. New London, NH. <sup>+</sup>
- Persad, G.,** Y. Ming, and V. Ramaswamy, 2013: Surface and Atmospheric Forcing by Anthropogenic Aerosols: Insights from a Model-Observation Intercomparison. *Fifth Symposium on Aerosol-Cloud-Climate Interactions at 93<sup>rd</sup> AMS Annual Meeting*, Austin, TX. <sup>+</sup>

**CONFERENCE ABSTRACTS (CONT.)**

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<sup>°</sup> Oral; <sup>+</sup> Poster; <sup>‡</sup> Recognized by award

**Persad, G.,** Y. Ming, and V. Ramaswamy, 2012: Aerosol-Driven Surface Solar Dimming over Asia: Insights from a Model-Observation Intercomparison. *American Geophysical Union Fall Meeting*, San Francisco, CA.<sup>°</sup>

**Persad, G.,** Y. Ming, and V. Ramaswamy, 2012: Aerosols and the Surface Energy Balance: A Modeling Perspective. *Fourth Symposium on Aerosol-Cloud-Climate Interactions*<sup>°</sup> and *11<sup>th</sup> Annual AMS Student Conference*<sup>+</sup> at *92<sup>nd</sup> AMS Annual Meeting*, New Orleans, LA.<sup>‡</sup>

**Persad, G.,** Y. Ming, and V. Ramaswamy, 2011: Using Energy Balance Constraint to Analyze the Robustness of the Modeled Tropospheric Response to Absorbing Aerosols: Implications for Radiative and Hydrological Forcing. *XXV IUGG General Assembly*, Melbourne, Australia. Abstract M03S7-2092.<sup>°</sup>

**Persad, G.,** Y. Ming, V. Ramaswamy, 2011: The Tropospheric Response to Absorbing Aerosols in the GFDL Model Suite: Implications for Climate Forcing. *Gordon Research Conference on Radiation & Climate*. Waterville, ME.<sup>+</sup>

**Persad, G.,** and Y. Ming, 2009: Investigating the Climate Impacts of Black Carbon in GFDL's AM2.1 Atmospheric General Circulation Model. *American Geophysical Union Fall Meeting*, San Francisco, CA.<sup>°</sup>

**Persad, G.,** S. Menon, and I. Sednev, 2008: An Assessment of Uncertainties in the NASA GISS ModelE GCM due to Variations in the Representation of Aerosol/Cloud Interactions. *American Geophysical Union Fall Meeting*, San Francisco, CA.<sup>+</sup>