

CURRICULUM VITAE

MIKA G. TOSCA

School of the Art Institute of Chicago
Jet Propulsion Laboratory

mtosca1@artic.edu
micktosca.com

EDUCATION

Ph.D., Earth System Science, University of California, Irvine. Irvine, CA	2012
M.S., Earth System Science, University of California, Irvine. Irvine, CA	2009
B.S., Mathematics-Statistics, University of Connecticut, Storrs. CT <i>cum laude, with honors</i>	2006

PROFESSIONAL APPOINTMENTS

Assistant Professor, School of the Art Institute of Chicago, Chicago, IL	2017-
Affiliate Researcher, NASA Jet Propulsion Laboratory, Pasadena, CA	2017-
Research Scientist, NASA JPL/UCLA (JIFRESSE), Pasadena, CA	2015-2016
Postdoctoral Scholar, NASA JPL/Caltech, Pasadena, CA	2012-2015
Graduate Student Researcher, U.C. Irvine, Dept. of Earth System Science, Irvine, CA	2006-2012
Undergraduate Researcher, UConn, Dept. NRME, Storrs, CT	2004-2005

AWARDS/GRANTS

Sub-contract with the NASA Jet Propulsion Laboratory and MISR Project <i>Administrator and Summer Intern Supervisor for the MISR Plume Project</i> \$40,000 / year	2017-
NASA Research Opportunities in Space and Earth Science (ROSES) Atmospheric Composition Campaign Data Analysis and Modeling <i>Co-Investigator; \$250k/year (total award)</i> <i>Scientific analysis of aircraft polarimetric/radiometric data</i>	2014-2017
NASA Earth System Science Graduate Fellowship <i>3-year renewable fellowship; \$30,000 / year</i>	2008-2010
Undergraduate Degree with Honors Distinction <i>Honors Thesis: 'New England Winter Climate Change: Relating Temperature and Precipitation to Changes in Annual Snowfall Totals'; Advisor: Dr. Anji Seth, Department of Geography</i>	2006

PUBLICATIONS

PEER-REVIEWED

F. Xu, G. van Harten, D. J. Diner, A. B. David, F. C. Seidel, B. Rheingans, M.G. Tosca, M. D. Alexandrov, B. Cairns, R. A. Ferrare, S. P. Burton, M. A. Fenn, C. A. Hostetler, R. Wood, J. Redemann (2018), Coupled retrieval of liquid water cloud and aerosol above cloud properties using the Airborne Multiangle SpectroPolarimetric Imager (AirMSPI), *submitted to J. Geophys. Res.*

Tosca, M.G., R. Fofrich, M. Laffin, et al. (2018), Characterizing MISR-derived global smoke plume heights for 2009 and 2010: a comparison with CALIOP retrievals, *in prep.*

H. Lee, S.-J. Jeong, O. Kalashnikova, **M.G. Tosca**, S.-W. Kim, J.-S. Kug (2017), Characterization of wildfire-induced aerosol emissions from the Maritime Continent peatland and Central African dry savannah with MISR and CALIPSO aerosol products, *J. Geophys. Res.*, *in review.*

Tosca, M.G., J.R. Campbell, M.J. Garay, S. Lolli, F.C. Seidel, J. Marquis, O.V. Kalashnikova (2017), Attributing accelerated summertime warming in the Southeast United States to recent reductions in aerosol burden: Indications from vertically-resolved observations, *Rem. Sens.* 9(7), 674, doi:10.3390/rs9070674.

Wiggins, E.B., S. Veraverbeke, J. Henderson, A. Karion, J. Miller, J. Lindaas, R. Commane, C. Sweeney, K. Luus, **M.G. Tosca**, S. Dinardo, S. Wofsy, C. Miller, J.T. Randerson (2016), The influence of daily meteorology on boreal fire emissions and regional trace gas variability, *J. Geophys. Res.* 121, doi: 10.1002/2016JG003434.

Tosca, M.G., O.V. Kalashnikova, M.J. Garay, D.J. Diner, J.T. Randerson (2015), Human caused fires limit convection in tropical Africa: First temporal observations and attribution, *Geophys. Res. Lett.*, 42, doi: 10.1002/2015GL065063.

Tosca, M.G., D.J. Diner, M.J. Garay and O.V. Kalashnikova (2014), Observational evidence of fire-driven reduction of cloud fraction in tropical Africa, *J. Geophys. Res.*, 119, 8418-8432, doi:10.1002/2014JD021759.

Tosca, M.G., J.T. Randerson and C.S. Zender (2013), Global impact of contemporary smoke aerosols from landscape fires on climate and the Hadley circulation, *Atmos. Chem. Phys.*, 13, 5227-5241, doi: 10.5194/acp-13-5227-2013.

Zender, C.S., A.G. Krolewski, **M.G. Tosca** and J.T. Randerson (2012), Tropical biomass burning smoke plume shape, reflectance, and age based on 2001—2009 MISR imagery of Borneo, *Atmos. Chem. Phys.*, 12, 3437-3454, doi: 10.5194/acp-12-3437-2012.

Tosca, M.G., J.T. Randerson, C.S. Zender, D.L. Nelson, D.J. Diner and J.A. Logan (2011), Dynamics of fire plumes and smoke clouds associated with peat and deforestation fires in Indonesia, *J. Geophys. Res.*, 116, D08207, doi: 10.1029/2010JD015148.

Tosca, M.G., J.T. Randerson, C.S. Zender, M.G. Flanner and P.J. Rasch (2010), Do biomass burning aerosols intensify drought in equatorial Asia during El Niño?, *Atmos. Chem. Phys.*, 10, 3515-3528, doi: 10.5194/acp-10-3515-2010.

POPULAR SCIENCE (NON-ACADEMIC)

Tosca, Michael [sic] (2015), The impact of savanna fires on Africa's rainfall patterns, *The Conversation / Africa*, 02 September 2015. URL: <https://theconversation.com/the-impact-of-savanna-fires-on-africas-rainfall-patterns-46942>

MEDIA

Interviewed by ABC7 Los Angeles affiliate about recent smog-global warming study, August 2017:
<http://abc7.com/science/could-smog-actually-slow-down-global-warming--/2322231/>

Interviewed by local print news media about recent smog-global warming study, August 2017:
<http://www.sgtribune.com/2017/08/13/the-possible-downfall-of-cleaning-the-air-according-to-jpl-study/>

Press release issued by JPL and NASA about our study showing smog limiting global warming in the southeast United States, August 7, 2017: <https://www.jpl.nasa.gov/news/news.php?feature=6914>

Interviewed by Roland Pease of BBC World Service on "Science in Action", August 2015:
<http://www.bbc.co.uk/programmes/p02ybvd1>

Press release issued by JPL and NASA on African burning-climate connection, August 2015:
<http://www.jpl.nasa.gov/news/news.php?feature=4681>

SELECTED PROFESSIONAL PRESENTATIONS

Tosca, M.G., (invited) "A Changing Planet: Global warming in the 21st century", presented to the Luxury Connect real estate conference in Beverly Hills, CA, October 2017.

Tosca, M.G., (invited) "A continent under siege: How climate change and anthropogenic fires are changing Africa", presented at the Truth. Climate. Now Symposium at the School of the Art Institute of Chicago, March 2017.

Tosca, M.G., (oral), "Recent reductions in aerosol burden have contributed to accelerated summertime warming in the southeast United States", presented at the AGU Fall Meeting, December 2016, San Francisco, CA.

Tosca, M.G., (oral) "Aerosol climatology in the Southeast US and applications to SEAC4RS campaign (2013)", presented at the SAS Modeling Workshop, June, 2015; Princeton, NJ.

Tosca, M.G., (oral) "Aerosol climatology in the Southeast US and applications to SEAC4RS campaign (2013)", presented at the SEAC4RS Science Team Meeting, May, 2015; Pasadena, CA.

Tosca, M.G., (oral) "Human amplification of drought-driven fire in tropical regions", presented at the European Geoscience Union General Assembly, April, 2015; Vienna, Austria.

Tosca, M.G., (oral) "Convective cloud inhibition attributed to dust and smoke aerosols in sub-Saharan Africa", presented at the American Meteorological Society Annual Meeting, January, 2015; Phoenix, AZ.

Tosca, M.G., (oral) "Observational evidence of fire-driven reduction of tropical cloud fraction", presented at the EGU General Assembly, May, 2014; Vienna, Austria.

Tosca, M.G., (oral) "Evaluating the cloud microphysical response to fire aerosols in southeast Asia using satellite observations: an approach", presented at the AGU Fall Meeting, December 3, 2012; San Francisco, CA.

Tosca, M.G., (oral) "Fire and smoke in the Earth system: Evaluating the impact of fire aerosols on regional and global climate", presented at NASA Jet Propulsion Laboratory (job talk), March 1, 2012; Pasadena, CA.

Tosca, M.G., (oral) J.T. Randerson and C.S. Zender (2011), "Quantification of regional radiative impacts and climate effects of tropical fire aerosols", presented by M.G. Tosca at AGU Fall Meeting, December 2011; San Francisco, CA

Tosca, M.G., (oral) "Characteristics of Borneo and Sumatra fire plumes and smoke clouds and their impact on regional El Niño-induced drought", presented at the EGU General Assembly 2010, May 3, 2010; Vienna, Austria.

Tosca, M.G., J.T. Randerson and C.S. Zender, **(poster)** "Characteristics of fire plume heights and smoke clouds on Borneo and Sumatra", poster presented by M.G. Tosca at the NASA LCLUC Spring Team Meeting, April 22, 2010; Bethesda, MD.

Tosca, M.G. and S.B. Capps, **(oral)**, "Solar energy and the Earth's energy budget", presented by M.G. Tosca and S.B. Capps at the Summer Science Institute, August 10, 2009; Irvine, CA.

Tosca, M.G., J.T. Randerson, C.S. Zender, M.G. Flanner and P.J. Rasch, **(oral)** "Do biomass burning aerosols intensify drought in equatorial Asia during El Niño?", presented by M.G. Tosca at the Marie-Curie iLEAPS Feedback and Land-Climate Dynamics Conference, November 16-20, 2008; Hyeres, France

PROFESSIONAL WORKSHOPS

Marie-Curie iLEAPS Feedback and Land-Dynamics Conference, *Hyeres, France* November 16-20, 2008

AIMES 4th YSN Workshop:
Cultural Uses and Impacts of Fire: Past, Present and Future, *Boulder, CO* July 14-28, 2008

FIELD CAMPAIGNS

Observations of Aerosols above Clouds and their Interactions (ORACLES),
Walvis Bay & Swakopmund, Namibia 2016

Studies of Emissions and Atmospheric Composition, Clouds and
Climate Coupling by Regional Surveys (SEAC⁴RS), *Houston, TX* 2013

TEACHING

Assistant Professor, SAIC	2017-
-Three undergraduate, non-major, classes	
Mentor for summer interns at Jet Propulsion Laboratory	2015, 2016
-Two undergraduate interns in 10-week program	
Meteorology Instructor at Waldorf High School, Costa Mesa, CA (10 th grade)	2010—2012
Teaching Assistant, Earth System Science 1, "The Physical Environment"	Winter 2008
-Guest Lecture: Earth's radiation budget	
Teaching Assistant, Earth System Science 55, "Earth's Atmosphere"	Spring 2008
-Guest Lecture: Small-scale winds	
Teaching Assistant, Earth System Science 1, "The Physical Environment"	Fall 2009
-Guest Lecture: Water vapor and aerosols	

ONGOING RESEARCH PROJECTS

- ~Tropical biomass burning aerosols; direct, semi-direct, indirect effects on climate and meteorology using regional & global models, remote sensing observations and aircraft measurements
- ~Tropical fire smoke plume dynamics, characterization and modeling
- ~Atmosphere-ocean-biosphere links to tropical biomass burning & climate modes (ENSO, etc.)
- ~Influence of aerosol burden and vertical distribution on trends in temperature and precipitation.
- ~Aerosol-cloud radiative and microphysical interactions and their effect on precipitation rates

OUTREACH

- ~ Participant in 3-week "Field Campaign Internship" program with 7 Namibian and South African graduate students in Swakopmund Namibia, Summer 2016
- ~ Mentor for two summer interns as part of JPL summer intern program, Summers 2015, 2016, 2017
- ~ Invited presenter: overview of climate change to high school students in Barrow, Alaska via Skype, 2015
- ~ Participant (3 years) in the Physical Science Undergraduate Mentor program (PSUM) at UC Irvine, 2012-2015
- ~ Regular presenter: California's changing climate and water resources to grades 1-9 as a member of the C.L.E.A.N non-profit organization (e.g. Compton H.S., Hicks Canyon Elementary, etc.), 2008-2012

OTHER RELATED INTERESTS

- ~Mid-latitude weather forecasting, analysis, blogging & storm chasing
- ~California's climate and ecosystems