**CURRICULUM VITAE**

MIKA G. TOSCA School of the Art Institute of Chicago

Jet Propulsion Laboratory

mtosca1@artic.edu

mikatosca.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 2006

*cum laude, with honors*

PROFESSIONAL APPOINTMENTS

Assistant Professor, School of the Art Institute of Chicago, Chicago, IL 2017-Current

Affiliate Researcher, NASA Jet Propulsion Laboratory, Pasadena, CA 2017-Current

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, CA2006-2012

Undergraduate Researcher**,** UConn, Dept. NRME, Storrs, CT 2004-2005

AWARDS/GRANTS

Sub-contract with the NASA Jet Propulsion Laboratory and MISR Project 2017-

*Administrator and Summer Intern Supervisor for the MISR Plume Project*

*$40,000 / year (2017-18)*

*$51,000 / year (renewed 2018-19)*

*Science Lead for the MISR Plume Project*

*$23,000 / year (renewed 2019-20)*

NASA Research Opportunities in Space and Earth Science (ROSES)

Atmospheric Composition Campaign Data Analysis and Modeling2014-2017

*Co-Investigator; $250k/year (total award)*

*Scientific analysis of aircraft polarimetric/radiometric data*

NASA Earth System Science Graduate Fellowship 2008-2010

*3-year renewable fellowship; $30,000 / year*

Undergraduate Degree with Honors Distinction 2006

*Honors Thesis: ‘New England Winter Climate Change: Relating Temperature and Precipitation to Changes in Annual Snowfall Totals’; Advisor: Dr. Anji Seth, Department of Geography*

PUBLICATIONS

TEXTBOOK CHAPTERS

**Tosca, Mika G**. (2019), "Chapter 16: Perspectives of Climate Monitoring in the Satellite Era", *Climate Changes in the Holocene: Their Impacts and Human Adaptation*, Ed.: Eustathios Chiotis, Boca Raton: CRC Press, eBook ISBN: 9781351260237.

POPULAR (PUBLIC) MEDIA

**Tosca, Mika** (2019), Transcending science: Can artists help scientists save the world? *Eos, 100*, doi: 10.1029/2019EO127493. Published on 02 July 2019.

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

REFEREED JOURNAL ARTICLES

Xu, F., van Harten, G., Diner, D. J., Davis, A. B., Seidel, F. C., Rheingans, B., **M.G. Tosca**, M. D. Alexandrov, B. Cairs, R. A. Ferrare, S. P. Burton, M. A. Fenn, C. A. Hostetler, R. Wood, J. Redemann (2018). Coupled retrieval of liquid water cloud and above‐cloud aerosol properties using the Airborne Multiangle SpectroPolarimetric Imager (AirMSPI). *J. Geophys. Res.*, 123, 3175–3204. doi: 10.1002/2017JD027926.

Val Martin, M., R. Kahn, **M. Tosca**, A global analysis of wildfire smoke injection heights derived from space-based multi-angle imaging, Remote Sensing, 10 (10), 1609, doi: [10.3390/rs10101609](https://doi.org/10.3390/rs10101609).

Lee, H., S.-J Jeong, O. Kalashnikova, **M.G. Tosca**, S.-W Kim, J.-S Kug (2018), Characterization of wildfire-induced aerosol emissions from the Maritime Continent and central African dry savannah with MISR and CALIPSO aerosol products, *J. Geophys. Res.,* 123 (6), 3116-3125doi: 10.1002/2017JD027415.

Mao, J., A. Carlton, R. C. Cohen, W. H. Brune, S. S. Brown, G. M. Wolfe, J. L. Jimenez, H. O. T. Pye, N.-L. Ng, L. Xu, V. F. McNeill, K. Tsigaridis, B. McDonald, C. Warneke, A. Guenther, M. J. Alvarado, J. de Guow, L. J. Mickley, E. M. Leibensperger, R. Mathur, C. G. Nolte, R. Portmann, N. Unger, **M. G. Tosca,** L. W. Horowitz (2018), Southeast Atmosphere Studies: learning from model-observation syntheses, *Atmos. Chem. Phys.,* 18, 2615-2651, doi: https://doi.org/10.5194/acp-18-2615-2018.

**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.

*SELECTED* PRESENTATIONS

**INVITED**

**Tosca, M.G., (invited)** “Transcending Science: Can art prevent a climate apocalypse? presented to the *Field Museum* Women in Science Seminar Series in Chicago, IL, June 2019.

**Tosca, M.G., (invited)** “Transcending Science: Can art prevent a climate apocalypse? (Or: Being a transgender climate scientist at an art university in the Age of Trump)", presented at the MIRA Conversations on Inclusion and Equity at the University of Michigan in Ann Arbor, MI, February 2019.

**Tosca, M.G., (invited)** “A continent on the brink: How climate change and wildfire are reconstituting life in Africa", presented at the CLaSP Seminar Series at the University of Michigan in Ann Arbor, MI, February 2019.

**Tosca, M.G., (invited)** "(Re)Designing Science: Can artists and designers help climate scientists prevent a climate apocalypse?", presented at the Geography: Data Science Speaker Series at Miami University (Ohio) in Oxford, OH, February 2019.

**Tosca, M.G., (invited)** "How can scientists help designers help scientists ask better questions?", presented to the Climate Change Equity Residency at the Headlands Center for the Arts in Sausalito, CA, September 2018.

**Tosca, M.G., (invited)** "An update on the MISR Plume Height Project: Three full years of data and comparison with CALIOP", presented to the MISR Science Team Meeting in Pasadena, CA, February 2018.

**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.

**CONFERENCE**

**2012-present**

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.

**2006-2012**

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., **(poster)** J.T. Randerson and C.S. Zender, "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. **(oral)** and S.B. Capps, "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., **(oral)** J.T. Randerson, C.S. Zender, M.G. Flanner and P.J. Rasch, "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

MEDIA

Interviewed by WTTW (PBS) Chicago about *Eos* article “Transcending Science…”, July 2019: <https://news.wttw.com/2019/07/09/climate-scientist-swaps-nasa-school-art-institute>

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.sgvtribune.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/p02ybvdl>

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

WORKSHOPS/SESSION CONVENING

✖ Convener, *Fire in the Earth System* Session at the AGU Fall Meeting, *Washington, DC* Dec. 2018

✖ Invited Participant, *Climate Change Equity Residency*

at the Headlands Center for the Arts, Sausalito, CA Sept. 2018

✖ Convener, *Fire in the Earth System* Session at the AGU Fall Meeting, *New Orleans, LA* Dec. 2017

✖ Convener, *Fire in the Earth System* Session at the AGU Fall Meeting, *San Francisco, CA* Dec. 2015-2016

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

✖ AIMES 4th YSN Workshop:

Cultural Uses and Impacts of Fire: Past, Present and Future, *Boulder, CO* Jul. 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-

Classes taught:

- *Earth's Changing Climate*: S17(2), F18(2), S18(2), F18(1), S19

- *Geoengineering*: S17, F18, S18, S19

- *Environmental Disasters*: Summer18, F18

- *Knowing Nature*: F18(1), S19(1)

-*Abrupt Climate Change*: OxBow19

Mentor for summer interns at Jet Propulsion Laboratory 2015-2018

-Two undergraduate interns in 10-week program

Meteorology Instructor at Waldorf High School, Costa Mesa, CA 2010—2012

(10th grade)

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

~Radical collaborations between artists, designers, and climate scientists: Can art, human engagement, and design principles help scientists be better communicators and better scientists?

~Tropical biomass burning aerosols; direct, semi-direct, indirect effects on climate and meteorology using regional & global models, remote sensing observations and aircraft measurements

~Landscape fire smoke plume dynamics, characterization, modeling and inter-platform comparison

~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

~ Led a 2-hour workshop on climate change at The Wing co-working space, July 2019.

*~* 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