

Yoichi Paolo Shiga

CONTACT INFORMATION

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RESEARCH INTERESTS

Yoichi's research explores the cycling of carbon, both anthropogenic and natural, between the atmosphere and the land leveraging a combination of atmospheric observations, remote-sensing measurements, and data driven statistical methods. His research focuses on improving our understanding of carbon flux patterns and drivers at regional to continental scales, addressing scales pertinent to advancing both scientific and policy goals in a changing climate.

EDUCATION

Stanford University , Stanford, CA	Civil & Environmental Engineering	Ph.D. April 2018
Advisor: Dr. Anna M. Michalak		
University of Michigan , Ann Arbor, MI	Civil & Environmental Engineering	M.S. 2011
University of California San Diego , La Jolla, CA	Aerospace Engineering	B.S. 2008

POSITIONS HELD

Postdoctoral Fellow, Supervisor: Dr. Joseph Berry April 2018 - present
Department of Global Ecology, Carnegie Institution for Science, Stanford, CA

PUBLICATIONS

- Shiga, Y. P.** (2018). Characterizing natural and anthropogenic carbon flux spatiotemporal variability at regional scales using a dense network of atmospheric CO₂ observations over North America (Doctoral dissertation). Stanford University. Retrieved from <https://searchworks.stanford.edu/view/12375809>
- Shiga, Y.P.**; Tadić, J.; Yadav, V.; Qiu, X.; Andrews, A.; Berry, J.; Michalak, A.M.; (2018), "Atmospheric CO₂ observations reveal strong correlation between regional net biospheric carbon uptake and solar induced chlorophyll fluorescence," *Geophysical Research Letters*, 44, [doi:10.1002/2017GL076630](https://doi.org/10.1002/2017GL076630).
- Alden, C.; Miller, J.; Gatti, L.; Gloor, M.; Guan, K.; Michalak, A.M.; van der Laan-Luijkx, I.T.; Touma, D.; Andrews, A.E.; Basso, L.S.; Correia, C.S.C.; Domingues, L.G.; Joiner, J.; Krol, M.C.; Lyapustin, A.I.; Peters, W.; **Shiga, Y.P.**; Thoning, K.; van der Velde, I.; van Leeuwen, T.T.; Yadav, V.; Diffenbaugh, N.; (2016), "Regional atmospheric CO₂ inversion reveals seasonal and geographic differences in Amazon net biome exchange," *Glob Change Biol*, 22: 3427–3443. [doi:10.1111/gcb.13305](https://doi.org/10.1111/gcb.13305).
- Yadav, V.; Michalak, A.M.; Ray, J.; **Shiga, Y.P.**; (2016), "A statistical approach for isolating fossil fuel emissions in atmospheric inverse problems," *J. Geophys. Res. Atmos.*, 121, 12,490–12,504, [doi:10.1002/2016JD025642](https://doi.org/10.1002/2016JD025642).
- Jucks, K.; Neeck, S.; Abshire, J.; Baker, D.; Browell, E.; Chatterjee, A.; Crisp, D.; Crowell, S.; Denning, S.; Hammerling, D.; Harrison, F.; Hyon, J.; Kawa, S.; Lin, B.; Meadows, B.; Menzies, R.; Michalak, A.; Moore, B.; Murray, K.; Ott, L.; Rayner, P.; Rodriguez, O.; Schuh, A.; **Shiga, Y.**; Spiers, G.; Wang, J.; Zaccheo, T.; (2015), Active Sensing of CO₂ Emissions over Nights, Days, and Seasons (ASCENDS) Mission, Science Mission Definition Study.
- Fang, Y.; Michalak, A. M.; **Shiga, Y. P.**; and Yadav, V. (2014), "Using atmospheric observations to evaluate the spatiotemporal variability of CO₂ fluxes simulated by terrestrial biospheric models," *Biogeosciences*, 11, 6985–6997, [doi:10.5194/bg-11-6985-2014](https://doi.org/10.5194/bg-11-6985-2014).
- Shiga, Y.P.**; Michalak, A.M.; Gourdji, S.M.; Mueller, K.L., Yadav, V. (2014), "Detecting Fossil Fuel Emissions Patterns From Sub-Continental Regions Using North American In-Situ CO₂ Measurements," *Geophys. Res. Lett.*, 41, 4381–4388, [doi:10.1002/2014GL059684](https://doi.org/10.1002/2014GL059684).

Shiga, Y.P.; Michalak, A.M.; Kawa, S.R.; Engelen, R.J. (2013), “In-Situ CO₂ Monitoring Network Evaluation and Design: A Criterion Based on Atmospheric CO₂ Variability,” *J. Geophys. Res. Atmos.*, 118, 2007–2018, doi:[10.1002/jgrd.50168](https://doi.org/10.1002/jgrd.50168).

(In review/preparation)

Shiga, Y.P.; Michalak, A.M.; and co-authors (2018), “Forests dominate the interannual variability of the North American carbon sink,” *In Prep.*

INVITED PRESENTATIONS

Shiga, Y.P., “Decision Making in a Changing Climate,” *Stanford Summer College Academy - Climate Change: Biology, Impacts, and What You Can Do*, Guest Lecture, Stanford, California, August 2015.

Shiga, Y.P., “Gender Roles and Engineering Student Teams,” *Stanford Student Chapter of the American Society for Engineering Education*, Oral Presentation, Stanford, California, November 2014.

Shiga, Y.P., “Atmospheric Inverse Modeling and Uncertainty Quantification for Surface Fluxes,” *Next-Generation Ecosystem Experiments – Arctic: Scaling Workshop*, Oral Presentation, Oak Ridge, Tennessee, April 2013.

CONFERENCE PRESENTATIONS

Andrews, A. E.; Trudeau, M.; Hu, L.; Thoning, K. W.; **Shiga, Y. P.**; Michalak, A. M.; Benmergui, J. S.; Mountain, M. E.; Nehrkorn, T.; O'Dell, C.; Jacobson, A. R.; Miller, J.; Sweeney, C.; Chen, H.; Ploeger, F.; Tans, P. P., "Evaluation of the Consistency among In Situ and Remote Sensing Measurements of CO₂ over North America using the CarbonTracker-Lagrange Regional Inverse Modeling Framework," *American Geophysical Union*, Abstract A43C-2469, Fall Meeting, December 2017

Shiga, Y.P.; Tadić, J.; Yadav, V.; Qiu, X.; Berry, J.; Joiner, J.; Michalak, A.M., “Satellite Measurements of Solar-Induced Fluorescence Help to Constrain CO₂ Fluxes in Atmospheric Inversions,” *American Geophysical Union*, Abstract A53R-02, Oral Presentation, Fall Meeting, December 2014.

Alden, C. B.; Miller, J. B.; Gatti, L.; Gloor, M.; Guan, K.; Diffenbaugh, N. S.; Thoning, K. W.; **Shiga, Y. P.**, “Investigating drought impacts on Amazon Basin carbon fluxes through regional inverse modeling of CO₂ from aircraft vertical profiles,” *American Geophysical Union*, Abstract B22A-08, Fall Meeting, December 2014

Michalak, A. M.; Ray, J.; **Shiga, Y. P.**; Yadav, V., “Assessing regional anthropogenic emissions from observations of atmospheric CO₂,” *American Geophysical Union*, Abstract A11P-04, Fall Meeting, December 2014

Shiga, Y.P.; Michalak, A.M.; Yadav, V.; Gourdji, S.M., “Detecting the Fossil Fuel Emissions Signal from Atmospheric CO₂ Measurements Using Inverse Methods,” 9th *International Carbon Dioxide Conference*, Oral Presentation, Beijing, China, June 2013.

Shiga, Y.P.; Michalak, A.M.; Yadav, V.; Gourdji, S.M., “Exploring the Ability of Inverse Methods to Isolate the Fossil Fuel Emission Signal from Atmospheric CO₂ Measurements,” 4th *North American Carbon Program All Investigators Meeting*, Poster Presentation, Albuquerque, New Mexico, February 2013.

Michalak, A. M.; Fang, Y.; Miller, S. M.; Ray, J.; **Shiga, Y. P.**; Yadav, V.; Zscheischler, J., “Targeting patterns: A path forward for uncertainty quantification in carbon cycle science?” *American Geophysical Union*, Abstract GC34C-04, Fall Meeting, December 2013

Fang, Y.; Michalak, A. M.; **Shiga, Y. P.**; Yadav, V., “A process-level evaluation of the spatiotemporal variability of CO₂ fluxes predicted by terrestrial biosphere models using atmospheric data,” *American Geophysical Union*, Abstract A32E-02 Fall Meeting, December 2013

Shiga, Y.P.; Michalak, A.M.; Yadav, V.; Gourdji, S.M., “Exploring the Ability of Inverse Methods to Isolate the Fossil Fuel Emission Signal from Atmospheric CO₂ Measurements,” *American Geophysical Union*, Abstract GC51G-08, Oral Presentation, Fall Meeting, December 2012.

Yadav, V.; **Shiga, Y. P.**; Michalak, A. M., “Disaggregating Fossil Fuel Emissions from Biospheric Fluxes: Methodological Improvements for Inverse Methods,” *American Geophysical Union*, Abstract A53A-0138, Fall

Meeting, December 2012

Shiga, Y.P.; Michalak, A.M.; Hammerling, D.; Chatterjee, A.; Kawa, S.R.; Engelen, R.J., Gourджи, S.M.; Mueller, K.L.; Yadav, V., "In Situ CO₂ Monitoring Network Evaluation and design: A Criterion Based on Atmospheric CO₂ Variability," *Earth System Research Laboratory, Global Monitoring Annual Conference*, Oral Presentation, April 2012.

Shiga, Y.P.; Hammerling, D.; Kidder, S.; Forsythe, J., "Mapping Total Precipitable Water Over North America by Blending GOES sounder, GPS, and Mirs Observations," *American Meteorological Society*, TJ17.4, Oral Presentation, January 2012.

Shiga, Y.P.; Michalak, A.M.; Hammerling, D.; Chatterjee, A.; Kawa, S.R.; Engelen, R.J., Gourджи, S.M.; Mueller, K.L., "A monitoring network design tool for atmospheric carbon dioxide:Validation over North America," *American Geophysical Union*, Abstract A31B-0073, Poster Presentation, Fall Meeting, December 2011.

Mueller, K. L.; Gourджи, S. M.; Yadav, V.; Trudeau, M. E.; Chatterjee, A.; Huntzinger, D. N.; Andrews, A. E.; **Shiga, Y. P.;** Davis, K. J.; Stephens, B. B.; Law, B. E.; Fischer, M. L.; Dragoni, D.; Worthy, D.; Parker, M.; Goeckede, M.; Richardson, S.; Miles, N. L.; Michalak, A. M., "Assessing the impact of the expanding continuous measurement network in North America on carbon budgeting with an atmospheric inversion," *American Geophysical Union*, Abstract A31B-0077, Fall Meeting, December 2011

Shiga, Y.P.; Michalak, A.M.; Hammerling, D.; Chatterjee, A.; Kawa, S.R.; Engelen, R.J., "Evaluating the North American In-Situ Carbon Dioxide Monitoring Network," *American Geophysical Union*, Abstract GC13D-0726, Poster Presentation, Fall Meeting, December 2010.

Michalak, A. M.; Jackson, R. B.; Marland, G.; Sabine, C. L.; Gourджи, S. M.; Hammerling, D.; Mueller, K. L.; Shiga, Y. P.; Yadav, V., "Research needs and current approaches for a global carbon monitoring system: Monitoring requirements, synthesis of existing data streams, and emissions verification," *American Geophysical Union*, Abstract GC41G-05, Fall Meeting, December 2010

TEACHING

Teaching Fellow THINK40 – Sustainability Challenges and Transitions Fall 2016

Stanford University - Designed lessons, collaborated on syllabi & assignment development

TA EESS 214 – Intro to Geostatistics: Stanford University 2012 & 2013

Led Matlab/programming intro, consulted for student projects, and held office hours

Engineering Lab Instructor : Elementary Institute of Science, San Diego, CA 2008-2009

Taught hands-on engineering lessons in after-school science enrichment program

Lab Tutor MAE3 - Intro to Engineering Design: University of California San Diego Spring 2008

Worked in team teaching unit facilitating first-year design/robot competition project

ACADEMIC LEADERSHIP AND SERVICE

Peer Ombuds Officer, Department of Global Ecology, Stanford, CA 2015-present

International Association of Ombudsman Certified

Provide impartial, informal, confidential avenue for conflict resolution

Board Member, American Society for Engineering Education (ASEE), Stanford Chapter 2013-2017

Organize monthly science and engineering education discussions

Planned annual engineering education colloquium

AWARDS & FELLOWSHIPS

Best Student Paper Award, American Geophysical Union Fall Meeting (December 2012)

1st Place (tie) Student Poster Winner at Michigan Geophysical Union (March 2011)

Rackham Merit Fellowship (Fall 2009-2011)

PROFESSIONAL MEMBERSHIP

American Geophysical Union (2010-Present)

American Society for Engineering Education (2013-Present)