Curriculum Vitae — Tony E. Wong

Assistant Professor
School of Mathematical Sciences
Rochester Institute of Technology
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Research Interests

model calibration, uncertainty and sensitivity
decision analysis
climate change impacts
Earth system modeling

Education

PhD	Applied Mathematics, University of Colorado Boulder *The Impact of Stable Water Isotopic Information on Parameter Calibration in a Land Surface Model* Advisors: W. Kleiber (CU-Boulder) and D. Noone (Oregon State)	2016
MS	Applied Mathematics, University of Colorado Boulder	2012
BA	Mathematics (Hons), Astrophysics, Ohio Wesleyan University	2010

Positions

Assistant Professor	Rochester Institute of Technology • School of Mathematical Sciences	2019-present
Instructor	University of Colorado Boulder • Department of Computer Science	2017-2019
Postdoctoral Scholar	Earth & Environmental Systems Inst, Penn State University • Developed open source sea-level rise model and calibration framework • Climate change impacts, coastal flood risk management	2016-2017
Graduate Research Assistant	University of Colorado Boulder • Land surface modeling, Bayesian parameter calibration • Developed water isotope-enabled land surface model, as part of a larger isotope-enabled global climate model	2011-2016
SIParCS Student Intern	National Center for Atmospheric Research • Increased functionality of Earth System Modeling Framework by adding support for proposed Climate and Forecasting grid conventions	2011
REU Student Intern	Harvard-Smithsonian Center for Astrophysics • Developed and streamlined reduction/classification pipeline for stellar spectra observed using the Hectochelle spectrograph on the Multiple Mirror Telescope	2009

Mentoring

MS Research Advisor	Ken Shultes Mathematical Sciences, RIT	2020-present
Research Advisor	Alana Hough Mathematical Sciences, RIT	2020-present
Undergraduate Research Advisor	Matthew Peeks Mathematical Sciences, RIT	2020-present
	Hannah Sheets Mathematical Sciences, RIT	2020-present
Co-op Student Co-advisor	Patrick Ribas Mathematical Sciences, RIT	2020
Undergraduate Student Assistant	Devansh Computer Science, RIT	2020
	Travis Torline Computer Science, CU Boulder	2019
Senior Thesis Advisor	H. Nihar Nandan Computer Science, CU Boulder	2018-2019
Independent Study Advisor	Mingxuan Zhang Applied Mathematics, CU Boulder	2018-2019
	Kyle Rosenberg Computer Science, CU Boulder	2019
	Jon Oulton Computer Science, CU Boulder	2019
	John Letey Computer Science, CU Boulder	2018
Summer Research Co-Advisor	Alexandra Klufas Climate Science REU, Penn State	2017
Master's Thesis Co-Advisor	Robert Fuller Department of Geosciences, Penn State	2016-2017

Teaching

Primary Instructor	Probability & Statistics I (MATH 251) Stochastic Processes (MATH 505/605) Climate Change: Science, Technology & Policy (ENVS 531/631; team-taught) Project-Based Calculus 1 (MATH 181)
	CS1: Starting Computing (CSCI 1300) Discrete Structures (CSCI 2824) Discrete Structures Workgroup (CSCI 2830), Intro. to Data Science with Prob/Stats (CSCI 3022)

	Intro. to Artificial Intelligence (CSCI 3202)
	The Earth System (EARTH 002)
	Calculus 2 for Engineers (APPM 1360) Calculus 3 for Engineers (APPM 2350) Differential Equations with Linear Algebra (APPM 2360)
	Calculus 1 for Engineers Workgroup (GEEN 1350) Calculus 2 for Engineers Workgroup (GEEN 1360)
Lead Teaching Assistant	Seminar in Teaching Excellence (APPM 7500) Calculus 1 for Engineers (APPM 1350)
Teaching Assistant	Calculus 1 for Engineers (APPM 1350) Calculus 2 for Engineers (APPM 1360) Differential Equations with Linear Algebra (APPM 2360)
Lab Assistant	The Astronomical Universe (ASTR 111)

Grants and Funding

UIUC/PNNL (PSU EM170165), Co-PI — Dec 2016 - May 2018
Advise on use of emulators and data assimilation
$100,000 (Penn State amount, sub-award through U. of Illinois)

CU Undergraduate Research Opportunities Program, PI — May - July 2019
Comparison of Methods for Estimating Future Flood Risk in New Orleans, Louisiana
$2,000

RIT Dean's Research Initiation Seed Grant, PI — Dec 2019 - Dec 2020
Evaluating drivers of uncertainty in deep-time paleoclimate constraints on the CO2-temperature relationship
$14,000

RIT SRS GWBC20 Seed Grant, PI — Jul 2020 - Jun 2021
Characterizing uncertainty in future coastal hazards and damages from sea-level rise
$5,000

NSF Research Experiences for Undergraduates, senior personnel — Apr 2020 - Mar 2023
REU Site: Interdisciplinary Problem Solving in Human Dominated Wetland Ecosystems
$404,437

Honors and Awards

Graduate Fellowship (Cooperative Inst. for Research in Environmental Sciences)	2014
Robert L. Wilson Mathematics Prize (Ohio Wesleyan U.)	2010
Rogers D. Rusk Prize in Astrophysics (Ohio Wesleyan U.)	2010
BA awarded summa cum laude (cumulative GPA ≥ 3.97) (Ohio Wesleyan U.)	2010

Professional Service

Treasurer, American Statistical Association Rochester Chapter	2020-present
Rochester Museum & Science Center *Water Worlds* science advisory committee	2019-present
Undergraduate Curriculum Committee (RIT SMS)	2019-present
European Geosciences Union	2017-present
Society for Decision Making Under Deep Uncertainty	2016-present
American Geophysical Union	2013-present
CU-Boulder Instructor-Track Faculty Affairs Committee	2018-2019
Undergraduate Curriculum Committee (CU Dept. of Computer Science)	2017-2019
Vice President, CU-Boulder Graduate Chapter, SIAM	2016
Department of Applied Mathematics Program Fees Committee	2015
Organizing Committee Member, SIAM Front Range Student Conference	2014, 2015
Judge, Prospect Ridge Academy, Corden Pharma Colorado Regional, Boulder Country Day School Science Fairs	2013-2016
NCAR Land Model Working Group	2013-2016
President, CU-Boulder Graduate Chapter, SIAM	2013-2015
Lead Graduate Teaching Assistant, Department of Applied Mathematics	2011-2012
Chapter President, OWU Student Chapter of Society of Physics Students	2009-2010
Student Board Chair, OWU Depts of Mathematics, Physics and Astronomy	2009-2010
Asst. Conference Coordinator, Fall 2009 Meeting, Ohio Section, APS	2009

Reviewer: New York City Panel on Climate Change 2018 Report

Referee:
Advances in Statistical Climatology, Meteorology and Oceanography
Climatic Change
Earth's Future
Environmental Modeling and Software
Environmental Research Letters
Environmental and Resource Economics
Geophysical Research Letters
Journal of Climate
Journal of Geophysical Research - Biogeosciences
Journal of Hydrometeorology

Journal of Marine Science and Engineering
Natural Hazards
Nature
Proceedings of the National Academy of Sciences
Water

Publications

In prep:

Wong, T.E. and M. Cox (2020), An analysis of the class size effect in undergraduate mathematics and computer science courses.

In review:

Errickson, F.C., **T.E. Wong**, K. Keller, and D. Anthoff (2020), Improved Climate Modeling Reduces the Upper Tail of the Social Costs of Carbon.

Wong, T.E., T. Torline, and M. Zhang (2020), Evidence for increasing frequency of extreme coastal sea levels. (preprint at: https://arxiv.org/abs/2006.06804)

Wong T.E., G.M. Thurston, N. Barlow, N. Cahill, L. Carichino, K. Maki, D. Ross, and J. Schneider (2020), Evaluating the Sensitivity of SARS-CoV-2 Infection Rates on College Campuses to Wastewater Surveillance. (preprint at: https://doi.org/10.1101/2020.10.09.20210245)

Wong, T.E., Y. Cui, D. Royer, and K. Keller (2020), A tighter constraint on Earth-system sensitivity from long-term temperature and carbon-cycle observations. (preprint at: https://arxiv.org/abs/1910.11987)

Published:

1. Vega-Westhoff, B., R. Sriver, C. Hartin, **T. Wong**, and K. Keller (2020), The Role of climate sensitivity in extreme sea-level rise projections, *Geophysical Research Letters*, DOI: 10.1029/2019GL085792.
2. **Wong, T.E.** (2019), Lasting coastal hazards from past greenhouse gas emissions, *Proceedings of the National Academy of Sciences*, DOI: 10.1073/pnas.1917051116.
3. Brady, E., Stevenson, S., Bailey, D., Liu, Z., Noone, D., Nusbaumer, J., Otto-Bliesner, B., Tabor, C., Tomas, R., **Wong, T.**, Zhang, J., Zhu, J. (2019), The connected isotopic water cycle in the Community Earth System Model version 1, *Journal of Advances in Modeling Earth Systems*, DOI: 10.1029/2019MS001663.
4. Vega-Westhoff, B., R.L. Sriver, C.A. Hartin, **T.E. Wong**, and K. Keller (2019), Impacts of observational sea-level change constraints on estimates of climate sensitivity, *Earth's Future*, DOI: 10.1029/2018EF001082.
5. **Wong, T.E.** (2018), An Integration and Assessment of Covariates of Nonstationary Storm Surge Statistical Behavior by Bayesian Model Averaging, *Advances in Statistical Climatology, Meteorology and Oceanography*, DOI: 10.5194/ascmo-4-53-2018.

6. **Wong, T.** and B. Zaharatos (2018), The Road to T1 and the Critical Role of Teaching Faculty, white paper submitted to University of Colorado Boulder Academic Futures Committee. Available from: https://www.colorado.edu/academicfutures/response-papers

7. T. Mortlock, P. Somerville, **T. Wong**, and A. Bakker (2018), Thwaites and Pine Island Glaciers of Antarctica and the Prospect of Rapid Sea Level Rise, Risk Frontiers Briefing Note 367.

8. **Wong, T.E.**, A. Klufas, V. Srikrishnan, and K. Keller (2018), Neglecting Model Structural Uncertainty Underestimates Upper Tails of Flood Hazard, *Environmental Research Letters*, DOI: 10.1088/1748-9326/aacb3d.

9. Tabor, C., B. Otto-Bliesner, E. Brady, J. Nusbaumer, J. Zhu, M. Erb, **T.E. Wong**, Z. Liu, and D. Noone (2018), Interpreting precession driven δ18O variability in the South Asian monsoon region, *Journal of Geophysical Research: Atmospheres*, DOI: 10.1029/2018JD028424.

10. Fuller, R., **T.E. Wong**, and K. Keller (2017), Probabilistic inversion of expert assessments to inform projections about Antarctic Ice Sheet responses, *PLoS ONE*, DOI: 10.1371/journal.pone.0190115.

11. Zhu, J., L. Zhengyu, E. Brady, B.L. Otto-Bliesner, S.A. Marcott, J. Zhang, X. Wang, J. Nusbaumer, **T.E. Wong**, A. Jahn, and D. Noone (2017), Investigating the direct meltwater effect in terrestrial oxygen-isotope paleoclimate records using an isotope-enabled Earth system model, *Geophysical Research Letters*, DOI: 10.1002/2017GL076253.

12. **Wong, T.E.** and K. Keller (2017), Deep Uncertainty Surrounding Coastal Flood Risk Projections: A Case Study for New Orleans, *Earth's Future*, DOI: 10.1002/2017EF000607.

13. **Wong, T.E.**, A.M.R. Bakker, and K. Keller (2017), Impacts of Antarctic Fast Dynamics on Sea-Level Projections and Coastal Flood Defense, *Climatic Change*, DOI: 10.1007/s10584-017-2039-4.

14. **Wong, T.E.**, A.M.R. Bakker, K.L. Ruckert, P.J. Applegate, K. Keller (2017). BRICK v0.2, a simple, accessible and transparent model framework for climate and regional sea-level projections, *Geoscientific Model Development*, DOI: 10.5194/gmd-10-2741-2017.

15. Zhu, J., L. Zhengyu, E. Brady, B.L. Otto-Bliesner, J. Zhang, D. Noone, R. Tomas, J. Nusbaumer, **T.E. Wong**, A. Jahn, and C. Tabor (2017), Reduced ENSO Variability at the LGM Revealed by an Isotope-enabled Earth System Model, *Geophysical Research Letters*, DOI: 10.1002/2017GL073406.

16. **Wong, T.E.**, W. Kleiber, D.C. Noone (2017), The Impact of Error Accounting in a Bayesian Approach to Calibrating Modeled Turbulent Fluxes in an Open-Canopy Forest, *Journal of Hydrometeorology*, DOI: 10.1175/JHM-D-17-0030.1.

17. Bakker, A.M.R, **T.E. Wong**, K.L. Ruckert, and K. Keller (2017), Sea-level projections representing deeply uncertain ice-sheet contributions, *Scientific Reports*, DOI: 10.1038/s41598-017-04134-5.

18. **Wong, T.E.**, V. Srikrishnan, D. Hadka, and K. Keller (2017). A Multi-Objective Decision-Making Approach to the Journal Submission Problem, *PLoS ONE*, DOI: 10.1371/journal.pone.0178874.

19. Nusbaumer, J., **T.E. Wong**, C. Bardeen, D.C. Noone (2017). Evaluating hydrological processes in the Community Atmosphere Model Version 5 (CAM5) using stable isotope ratios of water, *Journal of Advances in Modeling Earth Systems*, DOI: 10.1002/2016MS000839.

20. **Wong, T.E.**, J. Nusbaumer, D.C. Noone (2017). Evaluation of modeled land-atmosphere exchanges with a comprehensive water isotope fractionation scheme in the NCAR Community Land Model, *Journal of Advances in Modeling Earth Systems*, DOI: 10.1002/2016MS000842.

21. Teschner, B., N.M. Smith, Z.O. John, T. Borillo-Hutter, **T.E. Wong** (2017). How efficient are they really? A minimally invasive testing method of small-scale gold miners' gravity separation systems in the Guianas, *Minerals Engineering*, DOI: 10.1016/j.mineng.2017.01.005.
22. Ruckert, K.L., G. Shaffer, D. Pollard, Y. Guan, **T.E. Wong**, C.E. Forest, K. Keller (2017). Assessing the impact of retreat mechanisms in a simple Antarctic ice sheet model using Bayesian calibration, *PLoS ONE*, DOI:10.1371/journal.pone.0170052.
23. Berkelhammer, M., D. Noone, **T.E. Wong**, S. Burns, J. Knowles, A. Kaushik, P. Blanken, M. Williams, (2016). Convergent approaches to determine an ecosystem's transpiration fraction, *Global Biogeochemical Cycles*, DOI:10.1002/2016GB005392.
24. **Wong, T.E.** (advisors: D.C. Noone and W. Kleiber) (2016). The Impact of Stable Water Isotopic Information on Parameter Calibration in a Land Surface Model. PhD Thesis, University of Colorado, Boulder, Colorado, USA, DOI:10.13140/RG.2.2.30181.40162.

Book/Tutorial Chapters (not peer-reviewed)

- **Tony E. Wong**, Kelsey L. Ruckert, and Klaus Keller, 2018, *Sensitivity Analysis for a Simple Sea-Level Change Model*. In: Risk Analysis in the Earth Sciences: A Lab Manual with Exercises in R (Applegate, P. J., and Keller, K., eds.). https://leanpub.com/raes
(version in progress here: http://www.personal.psu.edu/vxs914/RAES/raes_v3p0.pdf)
- Kelsey L. Ruckert, **Tony E. Wong**, Yawen Guan, and Murali Haran, 2018, *Applying Markov chain Monte Carlo to sea-level data*. In: Risk Analysis in the Earth Sciences: A Lab Manual with Exercises in R (Applegate, P. J., and Keller, K., eds.). https://leanpub.com/raes
(version in progress here: http://www.personal.psu.edu/vxs914/RAES/raes_v3p0.pdf)
- Kelsey L. Ruckert, **Tony E. Wong**, Yawen Guan, Murali Haran and Patrick J. Applegate, 2018, *A Calibration Problem and Markov chain Monte Carlo*. In: Risk Analysis in the Earth Sciences: A Lab Manual with Exercises in R (Applegate, P. J., and Keller, K., eds.). https://leanpub.com/raes
(version in progress here: http://www.personal.psu.edu/vxs914/RAES/raes_v3p0.pdf)
- Kelsey L. Ruckert, **Tony E. Wong**, Benjamin Seiyon Lee, Yawen Guan, and Murali Haran, 2018, *Bayesian Inference and Markov chain Monte Carlo Basics*. In: Risk Analysis in the Earth Sciences: A Lab Manual with Exercises in R (Applegate, P. J., and Keller, K., eds.). https://leanpub.com/raes
(version in progress here: http://www.personal.psu.edu/vxs914/RAES/raes_v3p0.pdf)

Invited Talks

- **Wong, T.E.** and K. Keller, *Managing Risk in a Changing Climate*, Muller Award Lecture presented at Ohio Wesleyan University, Delaware, Ohio, 13 Apr 2017.
- **Wong, T.E.**, A.M.R. Bakker, K. Keller, *The Impacts of Fast Antarctic Dynamics on Sea-Level Rise and its Implications on Coastal Defense*, presented at Resources for the Future, Washington, D.C., 14 Nov 2016.
- **Wong, T.E.**, W. Kleiber, D.C. Noone, *Optimization of Modeled Land-Atmosphere Exchanges of Water and Energy by Bayesian Parameter Estimation*, presented at U.S. Geological Survey, Denver, Colorado, 8 Jul 2014.

Selected Presentations

- **T.E. Wong**, V. Srikrishnan, B.A. Vega-Westhoff, *Probabilistic projections for timing of global sea-level thresholds*, presented at 2019 Fall Meeting, American Geophysical Union, San Francisco, CA, 9-13 Dec 2019.
- **Wong, T.E.** and M. Zhang, *An Integration and Assessment of Nonstationary Storm Surge Statistical Behavior*, presented at US CLIVAR Workshop on Sea Level Hotspots from Florida to Maine: Drivers, Impacts, and Adaptation Workshop, Norfolk, VA, 23-25 Apr 2019.
- Vega-Westhoff, B., Sriver, R. L., Hartin, C., **Wong, T.**, and Keller, K., *A Hector application: Sea-level constraints tighten climate sensitivity and temperature projections, Hector, sea-level rise and probability*, presented at 2018 GCAM Community Modeling Workshop, College Park, MD, October 2018.
- Sriver, R. L., Vega-Westhoff, B., Hartin, C., **Wong, T.**, and Keller, K., *Pinning the Tails on HECTOR: Recent Model Developments and Bayesian Calibration using Global Sea-level Rise Information*, Poster presented at DOE Modeling PI meeting, Washington DC, November 2018.
- V. Srikrishnan, **T.E. Wong**, G.G. Garner, K. Keller. *Combining Remote and Local Observations In A Direct Policy Search for Coastal Flood Defense Under Deep Uncertainty*, presented at Society for Decision Making Under Deep Uncertainty 2017 Workshop, Oxford, UK, 14-15 Nov 2017.
- **Wong, T.E.** and K. Keller, *Probabilistic Projections of Coastal Flood Risk: A Case Study for New Orleans*, presented at 2017 Regional Sea Level Changes and Coastal Impacts Conference, WCRP/IOC, New York, NY, 10-14 Jul 2017.
- **Wong, T.E.** and K. Keller, *What are robust coastal risk management strategies?* presented at 2016 Fall Meeting, American Geophysical Union, San Francisco, CA, 12-16 Dec 2016.
- **Wong, T.E.**, W. Kleiber, D.C. Noone, *Optimization of Modeled Land-Atmosphere Exchanges by Bayesian Parameter Calibration*, presented at 2015 Society for Industrial and Applied Mathematics Front Range Student Conference, Denver, CO, 28 Feb 2015.
- Nusbaumer, J., **T.E. Wong**, D.C. Noone, *The Impact of Differing Land Surface Models and Water Isotopic Parameterizations to the Distribution of Water Isotopes in a Coupled Atmosphere-Land Global Climate Model*, presented at 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 Dec 2014.
- **Wong, T.E.**, M. Berkelhammer, D.C. Noone, *A model-based evaluation of evapotranspiration partitioning from stable water isotopes*, presented at 2014 Society for Industrial and Applied Mathematics Front Range Student Conference, Denver, CO, 1 Mar 2014.
- **Wong, T.E.**, *Stable water isotopes in CLM*, presented at Land Model Working Group Meeting, National Center for Atmospheric Research, Boulder, CO, 24-26 Feb 2014.
- Noone, D., S. Langford, J. Nusbaumer, **T.E. Wong**, *Toward deeper understanding of climate history from isotope proxy records by exploiting the synergy of process models and contemporary observations*. Workshop on Isotopes of Carbon, Water and Geotracers in Paleoclimate Research, Bern, Aug 2013.
- **Wong, T.E.**, M. Berkelhammer, D.C. Noone, *Constraining rooting profile and the partitioning of evapotranspiration by optimization and sensitivity analysis in an isotopically-enabled land surface model*, presented at 2012 Fall Meeting, AGU, San Francisco, CA, 3-7 Dec 2012.
- **Wong, T.E.** and R. Oehmke, *Expanding Regridding Capabilities of the Earth System Modeling Framework*, SIParCS Final Presentations, Boulder, CO, 26 Jul 2011.