

**Kay McMonigal (he/him or they/them)**

Postdoctoral scholar

Department of Marine, Earth, and Atmospheric Sciences

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**EDUCATION**

- 2020      **Ph.D.**, University of Miami (UM) Rosenstiel School of Marine and Atmospheric Sciences (RSMAS)  
 Meteorology and Physical Oceanography  
 Dissertation: *Estimating a time-series of South Indian Ocean heat transport*  
 Advisor: Lisa Beal
- 2015      B.A., Northwestern University  
 Earth and Planetary Sciences, Math, Integrated Sciences, minor: Gender Studies

**EMPLOYMENT**

- 2020 -      Postdoctoral Scholar  
 MEAS, North Carolina State University. Advisor: Sarah Larson
- 2015 - 2020   Graduate Research Assistant  
 University of Miami RSMAS
- 2014 - 2015   Undergraduate Research Assistant  
 Northwestern University Earth and Planetary Sciences (EPS)

**PUBLICATIONS - PEER REVIEWED**

- [5] **McMonigal, K.**, K. Gunn, L.M. Beal, S. Elipot, J.K. Willis, Convergent Indian Ocean heat transport drives recent warming. DOI: 10.1175/JPO-D-21-0085.1. In press with *Journal of Physical Oceanography*.
- [4] **McMonigal, K.**, S. Larson, ENSO explains the link between Indian Ocean Dipole and ocean meridional heat transport. DOI: 10.1029/2021GL095796. In press with *Geophysical Research Letters*.
- [3] **McMonigal, K.**, L.M. Beal, S. Elipot, K. Gunn, T. Morris, J. Hermes, A. Houk (2020): The impact of meanders, deepening and broadening, and seasonality on Agulhas Current temperature variability, *Journal of Physical Oceanography*, **50** (12).

[2] Gunn, K.L., L.M. Beal, S. Elipot, **K. McMonigal**, A. Houk (2020): Mixing of subtropical, central and intermediate waters driven by shifting and pulsing of the Agulhas Current, *Journal of Physical Oceanography*, **50** (12).

[1] **McMonigal, K.**, L.M. Beal, and J.K. Willis (2018): The seasonal cycle of the south Indian Ocean subtropical gyre circulation as revealed by Argo and satellite data, *Geophysical Research Letters*, **45** (17).

## **PUBLICATIONS - IN PREPARATION**

[3] Gunn, K.L., **K. McMonigal**, L.M. Beal, S. Elipot, E. McDonagh, Variability of Indian Ocean freshwater convergence driven by salinity advection. In prep for submission to *Journal of Physical Oceanography*.

[2] Larson, S., **K. McMonigal**, C. Deser, D. Amaya, I. Simpson, A. Clement, Y. Okumura, A. Capotondi, D. Bailey, K. Bellomo. A mechanically decoupled version of the community earth system model version 2 (CESM2).

[1] Gunn, K.L., **K. McMonigal**, L.M. Beal, S. Elipot, Eddy heat fluxes within the Agulhas Current.

## **PUBLICATIONS - OTHER**

Corrigendum to McMonigal et al., (2020). In press with *Journal of Physical Oceanography*.

Corrigendum to Gunn et al., (2020). In press with *Journal of Physical Oceanography*.

## **INVITED TALKS**

2021      *Why is the Indian Ocean warming so rapidly?*  
George Mason University, Fairfax, VA (virtual)

2021      *Convergence Indian Ocean heat transport drives recent warming*  
CASPO seminar, Scripps Institute of Oceanography, San Diego, CA (virtual)

## **SELECTED SCIENTIFIC PRESENTATIONS**

2022      *ENSO explains the link between Indian Ocean Dipole and meridional heat transport*  
Ocean Sciences Meeting (virtual, March 3)

2022      *Why is the Indian Ocean warming so rapidly?*  
South African Network for Coastal and Oceanic Research seminar (Jan 31)

2022      *Why is the Indian Ocean warming so rapidly?*  
Woods Hole Oceanographic Institute seminar series (Jan 25)

- 2022 *Why is the Indian Ocean warming so rapidly?*  
Northwestern University Earth and Planetary Sciences seminar (Jan 14)
- 2021 *Estimating a time series of South Indian Ocean heat transport*  
Physical Oceanography Dissertation Symposium, HI
- 2021 *Drivers of Indian and Pacific Ocean heat transport*  
International Workshop for Air-sea Interactions (virtual poster)
- 2020 *Estimating a time series of meridional heat transport of the Indian Ocean at 34°S*  
Ocean Sciences Meeting, San Diego, CA
- 2020 *Variability in Agulhas Current temperature and freshwater transports, with implications for Agulhas Leakage fluxes*  
Gateways to the Ocean Symposium, San Diego, CA
- 2019 *The time varying temperature transport of the Agulhas Current*  
IUGG Assembly, Montreal, Canada
- 2018 *The seasonal cycle of the South Indian Ocean subtropical gyre as revealed by Argo and satellite data*  
National Oceanography Centre, Southampton, UK
- 2018 *The seasonal cycle of the South Indian Ocean subtropical gyre as revealed by Argo and satellite data*  
University of Cape Town, South Africa
- 2018 *The seasonal cycle of the South Indian Ocean subtropical gyre (poster)*  
Statewide Graduate Research Symposium, Florida State University
- 2018 *The seasonal cycle of the South Indian Ocean subtropical gyre*  
University of Miami, Graduate Research Symposium
- 2017 *Meridional heat transport of the Indian Ocean across 34°S based on high resolution Agulhas Current hydrography, satellite, and Argo data*  
IAPSO-IAMAS-IAGA Joint Assembly, Cape Town, South Africa
- 2014 *Calcite rafts-rapid deposition of transgressive infill cave sequences as a new paleo sea level proxy (poster)*  
Geological Society of America, Vancouver, CA

**FUNDED GRANTS**

- 2019 **K. McMonigal:** Mary Roche Scholarship, University of Miami. \$10,000  
 2018 **K. McMonigal:** *Elevating diversity and inclusion at RSMAS*. University of Miami Career Development Fund. \$2,500.

**AWARDS & SCHOLARSHIPS**

- 2019 Mary Roche Scholarship, University of Miami  
 2018 Best physical sciences presentation, Graduate Student Research Symposium, UM  
 2017 RSMAS Career Development Award, University of Miami  
 2015 - 2020 University of Miami Graduate School Fellowship  
 2015 Scymour Schlanger Undergraduate Earth Science Award, EPS  
 2012 Academic All-Big Ten Student Athlete

**SEAGOING EXPERIENCE**

- 2020 FLOTSAM undergraduate cruises, RV Walton Smith, Florida Straits, Chief Scientist: Jim Happell. Two one day cruises. CTD operations and plankton tows.  
 2019 GO-SHIP I06S, RV Thomas G Thompson, Indian/Southern Ocean, Chief Scientist: Alex Orsi. 42 days. CTD operations, drifter and float deployment.  
 2018 Agulhas System Climate Array (ASCA), SA Agulhas, Indian Ocean, Chief Scientist: Lisa Beal. 14 days. Mooring recovery, CTD operations.  
 2016 ASCA, RV Algoa, Indian Ocean, Chief Scientist: Lisa Beal. 14 days. Mooring deployment, CTD operations.

**TEACHING EXPERIENCE****Instructor**

- 2020 *Introduction to Physical Oceanography*, UM  
 In person instructor for hybrid course. Lead instructor: Lisa Beal  
 2019 *Basic Dynamical Oceanography*, University of Cape Town  
**Guest Lecturer**  
 2021 *Introduction to Coastal Environments*, NCSU. Instructor: Christopher Osborne  
 2019 *Climate Change*, UM. Instructor: Amy Clement

**Teaching Assistant**

- 2018 *Environmental Oceanography*, UM. Instructor: Pamela Reid  
 2016 *Climate and Global Change*, UM. Instructor: Igor Kamenkovich

**Other Teaching Experience**

2019                    University of Miami Teaching Academy

2016 - 2019    Tutor, Tutorial Resources. Math, sciences, English for grades 6-12

**Mentoring**

Mahdi Hasan, PhD student, NCSU

Mahdi is working on projected Hadley cell expansion and its impacts on ocean circulation using CMIP models. I meet with him weekly to discuss science results and monitor his progress.

Sam Michlowitz, MS student, NCSU

Sam is working on storm dynamics in a model hierarchy. I have assisted her in learning the HPC systems and working with model output.

Kaitlyn Woznick, undergraduate student, University of Wisconsin-Madison

Kaitlyn is applying to graduate programs in paleontology and paleoclimate. We meet biweekly to help Kaitlyn prepare their applications.

Lauren Pressley, undergraduate student, NCSU

Lauren is working on understanding the drivers of wintertime tropical instability waves in the Atlantic. We meet weekly and I answer questions about coding over slack.

**SERVICE & OUTREACH**

Reviewer for *Geophysical Research Letters*, *Scientific Reports*, *Journal of Geophysical Research: Oceans*, *Atmosphere*, *Ocean Sciences*, *Communications Earth & Environment*, IPCC AR6 report.

Maintaining an Environment of Respect Aboard Ships (MERAS) committee member (UNOLS), 2021-present

International Association for the Physical Sciences of the Ocean, Early Career Scientist working group, committee member, 2019-present

Geosciences Education & Mentorship Support mentor

Unlearning Racism in Geosciences (URGE) Pod member, 2021

University of Miami RSMAS Student-Led Evaluations and Development, committee member

Ocean Sciences Bowl 2020 volunteer

Ocean Kids program 2019 volunteer

**RESEARCH EXPERIENCE**

CTD operations and sampling

Mooring deployment and recovery

Set up, calibration, quality control, and analysis of hydrographic data from CTDs, microCATs, CPIES, ADCPs, Nortek current meters

Interpolation of disparate data sources including mooring, Argo, and satellite

HPC usage

Programing with Matlab, python, cdo, NCL, shell, C++  
Processing of CCSM and CESM ocean, atmosphere, and sea ice output  
Running CESM including coupler modifications and large ensembles  
Writing workshop with Dallas Murphy, 2018  
Mentoring workshop with Merlin Wahlberg, 2018

### **PROFESSIONAL MEMBERSHIPS**

American Meteorological Society, member  
The Oceanography Society, member  
American Geophysical Union, member

### **REFERENCES**

Lisa Beal, Professor  
lbeal@rsmas.miami.edu

Sarah Larson, Assistant Professor  
slarson@ncsu.edu

Rana Fine, Professor Emeritus  
rfine@rsmas.miami.edu

Josh Willis, Project Scientist  
joshua.k.willis@jpl.nasa.gov