

# DAVID W. MURPHY

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Associate Professor  
University of South Florida  
Department of Mechanical Engineering

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Research Interests: Biological, ecological, and environmental fluid mechanics; oil spills; biomechanics and biofluids; collective animal behavior

**EMPLOYMENT**      **Associate Professor, Mechanical Engineering**      **2022 - present**

-University of South Florida, Tampa, FL

**Assistant Professor, Mechanical Engineering**      **2016 - 2022**

-University of South Florida, Tampa, FL

**Postdoctoral Fellow, Mechanical Engineering**      **2012 - 2016**

-Johns Hopkins University, Baltimore, MD

-Advisor: Joseph Katz

-Research area: Dispersion of oil spills by environmental flows

-Member of DROPPS Consortium (PI: Ed Buskey) funded by GOMRI (Gulf of Mexico Research Initiative)

**EDUCATION**      **Ph.D., Civil and Environmental Engineering**      **2012**

-Georgia Institute of Technology, Atlanta, GA

-Advisors: Donald Webster and Jeannette Yen

-Thesis topic: Hydrodynamics of swimming and sensing in zooplankton

**M.S., Mechanical Engineering**      **2008**

-Georgia Institute of Technology, Atlanta, GA

-Advisors: Ajit Yoganathan and Ari Glezer

-Thesis topic: Use of passive flow control to diminish turbulent shear stress-induced damage to blood cells in mechanical heart valves

**M.Phil. Biological Science**      **2005**

-Cambridge University, Cambridge, UK

-Supervisor: Charles Ellington

-Thesis topic: Fore- and hindwing aerodynamic interaction in locust flight

**Double B.S. in Mechanical Engineering and Biomedical Engineering**      **2004**

-University of Alabama at Birmingham

**AWARDS**

-2021-2022 Excellence in Research, Pre-Tenure Award (2022)

-USF Outstanding Research Achievement Award (2020)

-Gallery of Fluid Motion award at APS DFD 2019 (with PhD student Ali Al Dasouqi)

-National Science Foundation CAREER Award (2019)

-National Academies of Sciences, Engineering and Medicine Gulf Research Program Early-Career Research Fellowship (2017)

- Eco-DAS X Participant (Ecological Dissertations in the Aquatic Sciences – 2012)
- NSF Graduate Research Fellowship (2004 – 2007)
- NSF East Asia/Pacific Summer Institute Award; traveled to Australia (2008)
- Mundy Global Travel Award (awarded by Georgia Tech for travel to Panama, 2011)
- Dr. Robert H. Goddard Memorial Scholarship (one \$10,000 scholarship given annually by the National Space Club, 2004)
- Barry Goldwater Scholarship (2003)
- Engineering Student of the Year (Alabama Society of Professional Engineers, 2002)

**ACADEMIC HONORS**

- Best PhD Thesis Award in Civil and Environmental Engineering (2012 – 2013)
- Best Student Presentation at 2012 SICB meeting (awarded by Crustacean Society)
- “Kobe Award” for Best Student Poster at PIV '11 Conference (2011)
- Gates Cambridge Scholarship Finalist (2004)
- USA Today All College Academic Team (2002)

**TEACHING EXPERIENCE**

**Fluid Systems (EML 3701)** **Spring & Fall 2017, Spring 2018, 2019**  
An undergraduate course serving as an introduction to fluid mechanics

**Biological Fluid Mechanics (EML 6930)** **Fall 2016, 2018, & 2019; Spring 2021**  
This course consists of a month of lectures introducing the students to the topic, followed by the students performing a guided literature review in which they read, present, and lead discussions on articles related to a specific biofluids topic of their choice. In the final project, the students create (or extensively modify, update, and expand) a Wikipedia page on their topic.

**Advanced Fluid Mechanics (EML 6713)** **Fall 2020, 2021, & 2022**  
A graduate level course on fluid mechanics

**The Science of Oil Spills** **Jan. 2014**  
In this 3 week Inter-Session course at Johns Hopkins University that I designed, I introduced students to topics such as how and where oil spills occur, the behavior and fate of oil in the environment, various methods of oil spill cleanup, and the impact of spilled oil on organisms and human health

**STEP Program Fellowship** **2009**  
In this NSF-funded Student and Teacher Enhancement Partnership (STEP) program, graduate students were trained in inquiry-based pedagogy techniques during a summer class and subsequently partnered with a STEM high school class in metro Atlanta for the following school year. I regularly lectured and organized labs in an AP Biology class at Westlake High School. I also helped organize the Engineering Club and judged the school science fair.

**Teaching Assistant** **2010, 2012**  
-Held office hours for undergraduate Fluid Mechanics course (2010)  
-Guest lecturer in Fluid Mechanics course (2012)

**INVITED**

**Murphy, D. W.** 2022. "Flapping Flight in Air and Water: Bio-inspiration from tiny

## SEMINARS

insects and sea butterflies." Interdisciplinary Seminar on Bioloocomotion, Aerodynamics of Insect Flight in Turbulence (AIFIT) Research Group, Universities of Rostock, Paris, Berlin and Marseille, January 12, 2022, given virtually from Tampa, FL.

**Murphy, D. W.** 2021. "Flapping Flight in Air and Water: Bio-inspiration from tiny insects and sea butterflies." Department of Mechanical Engineering, University of Massachusetts, Dartmouth, October 29, 2021, Dartmouth, Massachusetts (given virtually from Tampa, FL).

**Murphy, D. W.** 2021. "Flapping Flight in Air and Water: Bio-inspiration from tiny insects and sea butterflies." Intelligent and Bio-Inspired Mechanics Seminar, Queen's University, January 3, 2021, Kingston, Ontario, Canada (given virtually from Tampa, FL).

**Murphy, D. W.** 2020. "Flapping Flight in Air and Water: Bio-inspiration from tiny insects and sea butterflies." Department of Mechanical Engineering, University of Houston, December 3, 2020, Houston, TX (given virtually from Tampa, FL).

**Murphy, D. W.** 2020. "Bursting Bubbles: Gas Escape, Vortex Ring Formation, and Aerosol Transport." Department of Civil and Environmental Engineering, University of Pittsburgh, November 20, 2020, Pittsburgh, PA (given virtually from Tampa, FL).

**Murphy, D. W.** 2019. "Flapping Flight in Air and Water: Bio-inspiration from tiny insects and sea butterflies." Palmer Station, November 19, 2019, Palmer Station, Antarctica.

**Murphy, D. W.** 2019. "Flapping Flight in Air and Water: Bio-inspiration from tiny insects and sea butterflies." Department of Aerospace and Ocean Engineering, Virginia Tech, April 22, 2019, Blacksburg, VA.

**Murphy, D. W.** 2019. "Flapping Flight in Air and Water: Bio-inspiration from tiny insects and sea butterflies." Department of Mechanical Engineering, Pennsylvania State University, April 11, 2019, State College, PA.

**Murphy, D. W.** 2018. "Sea Butterfly Swimming: Bio-Inspired Design for Aquatic Micro-Aerial Vehicles." Department of Mechanical Engineering, Florida A&M – Florida State University, April 10, 2018, Tallahassee, FL.

**Murphy, D. W.** 2017. "Flight of the sea butterfly." Bermuda Institute of Ocean Sciences, May 12, 2017, St. Georges, Bermuda.

**Murphy, D. W.** 2016. "Crude oil plumes in cross flow AND Underwater flight by the sea butterfly." USF College of Marine Science, September 9, 2016, St. Petersburg, FL.

**Murphy, D. W.** 2012. "Sensing and Swimming: The Hydrodynamics of Zooplankton Behavior." Center for Environmental and Applied Fluid Mechanics, Johns Hopkins University, November 8, 2012, Baltimore, MD.

**Murphy, D. W.**, Webster, D. R, and Yen, J. 2011. "A High Speed Tomographic PIV System for Investigating Plankton-Turbulence Interaction." Tokyo University of Marine Science and Technology, July 15, 2011, Tokyo, Japan.

**Murphy, D. W.**, Dasi, L., Glezer, A., and Yoganathan, A. 2008. "Reduction of flow-induced blood damage in bileaflet mechanical heart valves through passive flow control." August 3, 2008, Monash University, Melbourne, Australia.

**REVIEWER FOR**

*Journal of the Royal Society Interface*

*Journal of Fluid Mechanics*

*Experiments in Fluids*

*Physics of Fluids*

*International Journal of Multiphase Flow  
Fluids*

*Journal of Experimental Biology*

*Proceedings of the Royal Society B*

*Limnology & Oceanography: Fluids & Environments*

*Scientific Reports*

*PLOS ONE*

*Journal of Theoretical Biology*

*Bioinspiration and Biomimetics*

*Journal of Plankton Research*

*Bulletin of Mathematical Biology*

*Marine Environmental Research*

*PeerJ*

NSF Division of Ocean Sciences (*ad hoc*)

NSF Fluid Dynamics panel

NAS Gulf Research Program Early Career Fellowship Program

USF Internal Awards Program

**PUBLICATIONS  
(PEER REVIEWED)**  
(Student authors  
In italics)

*Gurung, S., Smith, C. A., Zeidi, S., Tejada-Martinez, A. E. **Murphy, D. W.** "An experimental Stommel Retention Zone facility with an application to oil droplet dispersion." *Limnology and Oceanography: Methods*, doi.org/10.1002/lom3.10510.*

Vahab, M., **Murphy, D. W.**, and Shoele, K. 2022. "Fluid dynamics of frozen precipitation at the air-water interface." *Journal of Fluid Mechanics*, 933, A36, doi:10.1017/jfm.2021.1097.

*Alshamrani, A. and **Murphy, D. W.** 2022. "An experimental study of oil slick contraction by chemical herders and fragmentation by obstacles." *Cold Regions Science and Technology*, 197, 103519.*

*Dasouqi, A. A., Ghossein, J., & **Murphy, D. W.** 2022. "The effect of liquid properties on the release of gas from bursting bubbles." *Experiments in Fluids*, 63(1), 1-14.*

Byron, M. L., **Murphy, D. W.**, Katija, K., Hoover, A. P., Daniels, J., *Garayev, K.*, Takagi, D., Kalso, E., Gemmell, B. J., Ruszczyk, M., and Santhanakrishnan, A. 2021.

"Metachronal motion across scales: current challenges and future directions." *Integrative and Comparative Biology* icab 105.

Garayev, K. and **Murphy D. W.** 2021. "Metachronal swimming of mantis shrimp: kinematics and interpleopod vortex interactions." *Integrative and Comparative Biology* icab 052.

Byron, M. L., Santhanakrishnan, A. and **Murphy, D.** 2021 "Metachronal coordination of multiple appendages for swimming and pumping." *Integrative and Comparative Biology* icab 181.

Herrera-Amaya, A., Seber, E. K., **Murphy, D. W.**, Patry, W. L., Knowles, T. S., Bubel, M. M., Maas, A. E., & M. L. Byron 2021. "Spatiotemporal Asymmetry in Metachronal Rowing at Intermediate Reynolds Numbers." *Integrative and Comparative Biology* icab 179.

Nayak, A. R., Jiang, H., Byron, M. L., Sullivan, J. M., McFarland, M., and **Murphy, D. W.** 2021. "Editorial: Small scale spatial and temporal patterns in particles, plankton, and other organisms." *Frontiers in Marine Science* 8:669530.

Perez, A. J., Cui, F., Peñaloza-Gutierrez, J., Zeidi, S., Sinha, N., Boufadel, M., *Smith, C.*, **Murphy, D. W.**, and Tejada-Martínez, A. E. 2021. "Simulation of vertical dispersion of oil droplets by Langmuir supercells through a Reynolds-averaged Eulerian formulation combined with Lagrangian particle tracking." *Ocean Engineering* 235: 109043.

*Dasouqi, A.*, Yeom, G.-S., and **Murphy, D. W.** 2021. "Bursting bubbles and the formation of gas jets and vortex rings." *Experiments in Fluids*, 62(1), 1-18.

*Dasouqi, A.* and **Murphy, D. W.** 2020. "Gas escape behavior from bursting bubbles." *Physical Review Fluids*, 5(11), 110502.

*Gurung, S.*, Dubansky, B., Virgen, C., Verbeck, G., and **Murphy, D. W.** 2020. "Effects of crude oil vapors on the cardiovascular flow of embryonic Gulf killifish." *Science of The Total Environment*, 141627.

*Karakas, F.*, Wingate, J., Blanco Bercial, L., Maas, A. E., & **Murphy, D. W.** 2020. "Swimming and Sinking Behavior of Warm Water Pelagic Snails." *Frontiers in Marine Science*, 7, 749.

*Karakas, F.*, Maas, A. E., and **Murphy, D. W.** 2020. "A novel cylindrical overlap-and-fling mechanism used by sea butterflies." *Journal of Experimental Biology*, 223(15).

*Olsen, D.* and **Murphy, D. W.** 2019. "Random sequential addition simulations of animal aggregations provide null models of group structure." *Bioinspiration and Biomimetics* 14(3), 035001.

Smith, N. M., Dickerson, A. K., and **Murphy, D. W.** 2019. "Organismal aggregations exhibit fluidic behaviors: a review" *Bioinspiration and Biomimetics* 14(3), 031001.

Skipper, A. N., **Murphy, D. W.** and Webster, D. R. 2019. "Characterization of hop-and-sink daphniid locomotion." *Journal of Plankton Research* 41(2), 142-153.

**Murphy, D. W.**, Olsen, D., Kanagawa, M., King, R., Kawaguchi, S., Osborn, J., Webster, D. R. and Yen, J. 2019. "The three-dimensional spatial organization of Antarctic krill schools in the laboratory." *Scientific Reports* 9, Article Number:381.

Karakas, F., D'Oliveira, D., Maas, A. E., and **Murphy, D. W.** 2018. "Using a shell as a wing: pairing of dissimilar appendages in atlantiid heteropod swimming." *Journal of Experimental Biology* 221(23), jeb192062.

**Murphy, D. W.**, Gemmell, B., Vaccari, L., Li, C., Bacosa, H., Evans, M., Gemmell, C., Harvey, T., Jalali, M., and Niepa, T. H. R. 2016. "An in-depth survey of the oil spill literature since 1968: Long term trends and changes since *Deepwater Horizon*." *Mar. Pollut. Bull.* 113, 371-379.

**Murphy, D. W.**, Xue, X., Sampath, K., and Katz, J. 2016. "Crude oil jets in crossflow: Effects of dispersant concentration on plume behavior." *J. Geophys. Res.-Oceans.*, 121, 4264-4281, doi:10.1002/2015JC011574.

**Murphy, D. W.**, Adhikari, D., Webster, D., and Yen, J. 2016. "Underwater flight in the planktonic sea butterfly." *J. Exp. Biol.* 219, 535-543.

**Murphy, D. W.**, Li, C., d'Albignac, V., Morra, D., and Katz, J. 2015. "Splash behavior and oily marine aerosol production by raindrops impacting oil slicks." *J. Fluid Mech.* 780, 536-577.

Yen, J., **Murphy, D. W.**, Fan, L., and Webster, D. R. 2015. "Sensory-motor systems of copepods involved in their escape from suction feeding." *Integr. Comp. Biol.* doi:10.1093/icb/icv051, 1-13.

**Murphy, D. W.**, Webster, D. R., and Yen, J. 2013. "The hydrodynamics of hovering in Antarctic krill." *Limnol. Oceanogr.-Fluids and the Environment.* 3, 240-255.

**Murphy, D. W.**, Webster, D. R., and Yen, J. 2012. "A high speed tomographic PIV system for measuring zooplanktonic flow." *Limnol. Oceanogr.-Meth.*, 10, 1096-1112.

**Murphy, D. W.**, Webster, D. R., Kawaguchi, S., King, R., and Yen, J. 2011. "Metachronal Swimming in Antarctic Krill: Gait Kinematics and System Design." *Marine Biology*, 158, 2541-2554.

Alben, S., Spears, K., Garth, S., **Murphy, D. W.**, and Yen, J. 2010. "Coordination of multiple appendages in drag-based swimming" *Journal of the Royal Society Interface*, 7(52), 1545-1557.

**Murphy, D. W.**, Dasi, L., Vukasinovic, J., Glezer, A., and Yoganathan, A. 2010. "Reduction of procoagulant potential of b-datum leakage jet flow in bileaflet mechanical heart valves via application of vortex generator arrays." *ASME J. Biomech. Eng.*, 132(7).

Dasi, L., **Murphy, D. W.**, Glezer, A., and Yoganathan, A., 2008. "Passive flow control of bileaflet mechanical heart valve leakage flow," *Journal of Biomechanics*, 41(6), 1166-1173.

Cherkaduvassala, V., **Murphy, D. W.**, Ban, H., Harrison, K. E., and Monroe, L. S. 2007. "Aerodynamic characteristics of popcorn ash particles," *Particulate Science and Technology* 3, 275-287.

Baker, J., Calvert, M.E., and **Murphy, D. W.**, 2002, "Structure and dynamics of laminar micro-slot jet diffusion flames," *Journal of Heat Transfer*, 124(4), 783-790.

**PUBLICATIONS  
(CONFERENCE)**

**Murphy, D.**, Afshar-Mohajer, N., Sidhaye, R., Koehler, K., Rule, A. and Katz, J. 2017. Development of an *In Vitro* Exposure System for Live Visualization of the Health Impacts of Oily Marine Aerosol on the Human Respiratory System. International Oil Spill Conference, May 15-18, 2017, Long Beach, CA.

**Murphy, D. W.**, Xue, X. and Katz, J. 2016. "Turbulent crude oil plumes in crossflow: Effect of counter-rotating vortex pair structures on oil residence in plume." 9<sup>th</sup> International Conference on Multiphase Flow, May 22-27, 2016, Florence, Italy.

**Murphy, D. W.**, Webster, D. R. and Yen, J. 2011. "A High Speed Tomographic PIV Investigation of Plankton-Turbulence Interaction." 9<sup>th</sup> International Symposium on Particle Image Velocimetry, July 21-23, 2011, Kobe, Japan.

**Murphy, D. W.**, Cherkaduvassala, V., Ban, H., Monroe, L., Harrison, K., 2002. "Evaluation of the Drag Coefficient of Coal Ash Particles," ASME International Mechanical Engineering Conference and Exposition, Paper No. IMECE2002-33116, Nov. 17-22, 2002, New Orleans.

**CONFERENCE  
PRESENTATIONS**  
(student authors  
in italics)

*Alshamrani, A.*, and **Murphy, D.** 2021. "Visualizations, flow measurements, and spatial distribution of a herded oil slick in the presence of various obstacles." International Oil Spill Science Conference. Oct 4-14 (online).

**Murphy, D.** 2022. "Release of micro-bubbles from snow melting in open waters: a novel source of polar aerosols." 10<sup>th</sup> SCAR Open Science Conference. August 1-10 (online).

*Garayev, K.*, and **Murphy, D.** 2022. "A novel annular flume to measure schooling behavior of Antarctic krill (*Euphausia superba*) under various environmental cues." 10<sup>th</sup> SCAR Open Science Conference. August 1-10 (online).

*Garayev, K., and **Murphy, D.*** 2022. "Schooling Behavior of Antarctic Krill Under Various Flow and Light Conditions." Ocean Sciences Meeting, Feb. 24 – March 24 (online).

*Garayev, K., and **Murphy, D.*** 2021. "Schooling Behavior of Antarctic Krill Under Various Flow and Light Conditions." American Physical Society, 74<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 21-23, Phoenix, AZ.

*Gurung, S., Hassan, M., Panth, S., Mee, T., Tejada-Martinez, A., and **Murphy, D.*** 2021. "Behavior of oil droplets under the influence of counter-rotating vortices in a Langmuir cell tank." American Physical Society, 74<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 21-23, Phoenix, AZ.

*Williams, E., and **Murphy, D.*** 2021. "Micro-PIV Measurements of a Tiny Insect Performing Clap and Fling." American Physical Society, 74<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 21-23, Phoenix, AZ.

***Murphy, D.,** and *Garayev, K.** 2021. "Dynamic Scaling of Metachronal Rowing." American Physical Society, 74<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 21-23, Phoenix, AZ.

*Alshamrani, A., and **Murphy, D.*** 2021. "Floating Crude Oils Slicks are Thickened by Chemical Herder and Fragmented by Obstacles Protruding through the Water Surface." American Physical Society, 74<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 21-23, Phoenix, AZ.

***Murphy, D.,** *Garayev, K.,* and *Mee, T.** 2021. "The collective response of Antarctic krill schools to various laboratory flow conditions." Society for Integrative and Comparative Biology, Jan 3-Feb 28, Chicago, IL (Virtual Presentation).

*Garayev, K. and **Murphy, D.*** 2021. "Vortex interactions among pleopod pairs in a mantis shrimp swimming at high advance ratios." Society for Integrative and Comparative Biology, Jan 3-Feb 28, Chicago, IL (**Invited Presentation**).

*Karakas, K., Maas, A., and **Murphy, D.*** 2021. "Shell geometry defines the swimming and sinking characteristics of pelagic snails." Society for Integrative and Comparative Biology, Jan 3-Feb 28, Chicago, IL (Virtual Presentation).

*Gurung, S., Smith C., Hoque, A., Mee, T., Singh S., Hassan M., Zeidi S., Tejada-Martinez, A. and **Murphy, D.*** 2020. "Oil droplet behavior in a counterrotating vortex pair generated in a Langmuir cell tank." American Physical Society, 73<sup>rd</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 22-24, Chicago, IL. (Virtual Presentation).

*Hamid, A., Mahairas, S., Gurung, S., Mee, T., and **Murphy, D.*** 2020. "Development of a Low Cost Field PIV System for Shallow Environmental Flows." American Physical Society, 73<sup>rd</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 22-24, Chicago, IL. (Virtual Presentation).



*Williams, E.*, and **Murphy, D.** 2020. "Wing Flapping by a Tiny Parasitoid Wasp." American Physical Society, 73<sup>rd</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 22-24, Chicago, IL. (Virtual Presentation).

*Alshamrani, A.*, and **Murphy, D.** 2020. "Herder-Induced Contraction and Fragmentation of Floating Crude Oil Slicks." American Physical Society, 73<sup>rd</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 22-24, Chicago, IL. (Virtual Presentation).

*Garayev, K.*, and **Murphy, D.** 2020. "High speed metachronal swimming by the peacock mantis shrimp." American Physical Society, 73<sup>rd</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 22-24, Chicago, IL. (Virtual Presentation).

*Dasouqi, A.*, *Yeom, G. S.*, and **Murphy, D.** 2020. "The Formation of Gas Jets and Vortex Rings from Bursting Bubbles." American Physical Society, 73<sup>rd</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 22-24, Chicago, IL. (Virtual Presentation).

*Karakas, F.*, *Maas, A.*, and **Murphy, D.** 2020. "Geometric and Dynamic Scaling of Marine Snail Swimming." American Physical Society, 73<sup>rd</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 22-24, Chicago, IL. (Virtual Presentation).

**Murphy, D.**, *Karakas, F.*, and *Maas, A.* 2020. "Swimming of a Subtropical Soft-bodied Sea Angel at Intermediate Reynolds Number." American Physical Society, 73<sup>rd</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 22-24, Chicago, IL. (Virtual Presentation).

*Williams, E.* and **Murphy, D.** 2020. "Flight of a tiny parasitoid wasp." Entomological Society of America Virtual Annual Meeting, Nov. 11-25, 2020.

*Karakas, F.*, *Al Dasouqi, A.*, *Maas, A.*, **Murphy, D.** 2020. "Pterobots: sea butterflies as soft robot models." IROS Robotics-Inspired Biology Workshop, Oct. 25, 2020. Virtual Conference Meeting.

*Wingate, J.*, *Karakas, F.*, **Murphy, D.**, *Maas, A. E.*, *Rossi, P.* 2020, "Swimming kinematics in "sea butterflies" – using image tracking software to characterize the 3D swimming of pteropods." Ocean Sciences Meeting, Feb. 16-21, San Diego, CA.

**Murphy, D.** 2020. "Introducing engineers to sea butterflies: lessons learned in interdisciplinary research." Gulf of Mexico Oil Spill and Ecosystem Science, February 3-6, Tampa, FL.

*Gurung, S.*, *Dubansky, B.*, **Murphy, D.** 2020. "Effects of crude oil vapors on the cardiovascular flow of embryonic Gulf killifish." Gulf of Mexico Oil Spill and Ecosystem Science, February 3-6, Tampa, FL.

*Smith, C., Li, Z., Singh, S., Arandia, J., Mee, T., Gurung, S., **Murphy, D.*** 2020. "Oil droplet and particle retention in turbulent vertical flow." Gulf of Mexico Oil Spill and Ecosystem Science, February 3-6, Tampa, FL.

Blackshare, T., Ford, M., *Garayev, K., **Murphy, D.*** Santhanakrishnan, A. 2020. "Metachronal, synchronous, and hybrid stroke patterns in aquatic paddling locomotion." Society for Integrative and Comparative Biology, January 3-7, Austin, TX.

*Al Dasouqi, A., **Murphy, D.*** 2019. "Bursting Bubbles and The Formation of Gas Jets and Vortex Rings." American Physical Society, 72<sup>nd</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 23-26, Seattle, WA.

*Smith, C., Li, Z., Singh, S., Arandia, J., Mee, T., Gurung, S., Tejada-Martinez, A., **Murphy, D.*** 2019. "Oil droplet and sediment suspension in laboratory-scale Stommel retention zones." American Physical Society, 72<sup>nd</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 23-26, Seattle, WA.

*Karakas, F., Al Dasouqi, A., Maas, A., **Murphy, D.*** 2019. "A Novel Cylindrical Clap-and-Fling Maneuver by Swimming Marine Snails." American Physical Society, 72<sup>nd</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 23-26, Seattle, WA.

Vahab, M., Shoele, K., **Murphy, D.**, 2019. "Thermal and Fluid Dynamics of Snow vs. Rain at the Air-Water Interface." American Physical Society, 72<sup>nd</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 23-26, Seattle, WA.

Herrera-Amaya, A., *Karakas, F., **Murphy, D.***, Byron, M. L. 2019. "The role of flexibility in sub-inertial swimming: An analysis of millimeter-scale ciliated structures." American Physical Society, 72<sup>nd</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 23-26, Seattle, WA.

**Murphy, D.**, *Olsen, D., Kanagawa, M., King, R., Kawaguchi, S., Osborn, J., Webster, D., Yen, J.* 2019. "The density and structure of Antarctic krill schools in the laboratory." ASLO Aquatic Sciences Meeting, February 23-March 2, San Juan, PR.

*Smith, C., Patel, A., Espinosa, J., Tejada-Martinez, A., **Murphy, D.*** 2019. "A Laboratory facility for investigating oil-particle interactions in deep Langmuir retention zones," Gulf of Mexico Oil Spill and Ecosystem Science, February 4-7, 2019, New Orleans, LA.

*Karakas, F., Maas, A., **Murphy, D.*** 2019. "Low Reynolds number swimming of sea butterflies with differently shaped shells," Microscale Ocean Biophysics, January 11-16, Whistler, Canada.

**Murphy, D.**, *Karakas, F., Maas, A.* 2019. "Swimming of a pteropod with a conical shell," Microscale Ocean Biophysics, January 11-16, Whistler, Canada.

Seber, E., Karakas, F., **Murphy, D. W.**, Byron, M. L. 2019. "Fluid dynamics of ciliary propulsion at intermediate Reynolds number: locomotion across ontogeny in the Atlantic ctenophore *Mnemiopsis leidyi*," Society for Integrative and Comparative Biology, January 3-7, Tampa, FL.

Karakas, F., Maas, A., **Murphy, D. W.** 2019. "Sea butterfly swimming: the effect of shell shape on pteropod kinematics and hydrodynamics," Society for Integrative and Comparative Biology, January 3-7, Tampa, FL.

**Murphy, D.**, Olsen, D., Kanagawa, M., King, R., Kawaguchi, S., Osborn, J., Webster, D., Yen, J. 2019. "Antarctic krill schools: linking three dimensional structure and function." Society for Integrative and Comparative Biology, January 3-7, Tampa, FL.

Al Dasouqi, A. and **Murphy, D.** 2018. "Gas jets and vortex rings released from bursting bubbles." American Physical Society, 71<sup>st</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 18-20, Atlanta, GA.

Garayev, K. and **Murphy, D.** 2018. "Metachronal rowing by a peacock mantis shrimp." American Physical Society, 71<sup>st</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 18-20, Atlanta, GA.

Gurung, S., Dubansky, B., **Murphy, D.** 2018. "Effects of oily marine aerosol in cardiovascular flow of embryonic Gulf Killfish" American Physical Society, 71<sup>st</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 18-20, Atlanta, GA.

Karakas, F., D'Oliveira, D., Maas, A., **Murphy, D.** 2018. "Using a shell as a wing: fluid dynamics and kinematics of atlantiid heteropod swimming." American Physical Society, 71<sup>st</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 18-20, Atlanta, GA.

**Murphy, D.** Karakas, F., Al Dasouqi, A., Garayev, K., Smith, H. 2018. "Time-resolved micro-PIV measurements around a freely flying tiny insect." American Physical Society, 71<sup>st</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 18-20, Atlanta, GA.

Zeidi, S., Sinha, N., Perez, A., **Murphy, D.**, Tejada-Martinez, A. 2018. "Sediment resuspension and oil droplet entrainment by Langmuir supercells," American Physical Society, 71<sup>st</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 18-20, Atlanta, GA.

Ghandour, M., Coutier-Delgosha, O., **Murphy, D.**, Katz, J. 2018. "Investigation of the impact of a raindrop on oil slicks at the sea surface," American Physical Society, 71<sup>st</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 18-20, Atlanta, GA.

Karakas, F., Maas, A., **Murphy, D. W.** 2018. "Swimming of an atlantiid heteropod," Association for the Sciences of Limnology and Oceanography (ASLO) Summer Meeting, June 10-15, 2018, Victoria, B.C., Canada.

Li, C., **Murphy, D. W.**, Sampath, K., Xue, X., Chandrala, L., Afshar-Mohajer, N., Nishida, K., Ronzhes, Y. Koehler, K., Sidhaye, R., Katz, J. 2018. "Dispersion and health impacts of crude oil spills by physical and chemical processes," Association for the Sciences of Limnology and Oceanography (ASLO) Summer Meeting, June 10-15, 2018, Victoria, B.C., Canada.

*Karakas, F.*, Maas, A., **Murphy, D.** 2018. "Sea butterfly swimming: bio-inspired design for aquatic micro-aerial vehicles," Air Force Science and Technology 2030 Workshop, April 25-26, Tampa, FL.

*Olsen, D.*, **Murphy, D.** 2018. "Swarm structure analysis: gauging the effect of swarm member shape," Air Force Science and Technology 2030 Workshop, April 25-26, Tampa, FL.

**Murphy, D. W.**, *Karakas, F.*, Maas, A. 2018. "A comparison of the swimming of two warm water pteropod species with dissimilar shell shapes," Ocean Sciences Meeting, Feb. 11-16, Portland, OR.

Skipper, A., **Murphy, D.W.**, Webster, D. 2018. "Vortex dynamics and viscous energy dissipation in hop-and-sink propulsion of the water flea," Ocean Sciences Meeting, Feb. 11-16, Portland, OR.

**Murphy, D. W.**, *Karakas, F.*, Maas, A. 2017. "Swimming of a tiny subtropical sea butterfly with coiled shell," American Physical Society, 70<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 19-21, Denver, CO.

*Karakas, F.*, Maas, A., **Murphy, D.** 2017. "Swimming of a sea butterfly with an elongated shell," American Physical Society, 70<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 19-21, Denver, CO.

*Bello, J.*, *Karakas, F.*, Maas, A. **Murphy, D.** 2017. "Sea butterfly swimming: bio-inspiration for aquatic robotic propulsion," ASME International Mechanical Engineering Conference and Exposition (IMECE), Paper No. IMECE2017-73355, Nov. 3-9, 2017, Tampa, FL.

*Olsen, D.*, **Murphy, D.** 2017. "Random sequential addition simulations to examine the role of "fish" shape on swarm structure," ASME International Mechanical Engineering Conference and Exposition (IMECE), Paper No. IMECE2017-73352, Nov. 3-9, 2017, Tampa, FL.

**Murphy, D. W.** 2016. "Snowflake impact on the air-sea interface," American Physical Society, 69<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, Nov. 20-22, Portland, OR.

**Murphy, D. W.**, Adhikari, D., Webster, D., and Yen, J. "Swimming of the sea butterfly *Limacina helicina*." National Academies Keck Futures Initiative – The Deep Blue Sea, Nov. 9-12, 2016, Huntington Beach, CA.

**Murphy, D. W.**, Webster, D. R., Kawaguchi, S. King, R., Osborn, J., and Yen, J. 2016, "The structure of Antarctic krill schools and the possible role of hydrodynamic interactions among schoolmates." *Microscale Ocean Biophysics*, Oct. 30 - Nov. 4, Eilat, Israel.

**Murphy, D. W.**, Xue, X. and Katz, J. 2016. "Turbulent crude oil plumes in crossflow: Effect of counter-rotating vortex pair structures on oil residence in plume." 9<sup>th</sup> International Conference on Multiphase Flow, May 22-27, 2016, Florence, Italy.

Skipper, A. N., **Murphy, D. W.**, Webster, D. R., and Yen, J. 2016. "Propulsion of the water flea, *Daphnia magna*: Experiments, scaling, and modeling." Ocean Sciences meeting, Feb. 21-26, New Orleans, LA.

**Murphy, D. W.**, Gemmell, B., Vaccari, L., Li, C., Bacosa, H., Evans, M., Gemmell, C., Harvey, T., Jalali, M., Niepa, T. 2016. "An in-depth survey of the oil spill literature since 1968: Trends and changes since *Deepwater Horizon*." Gulf of Mexico Oil Spill and Ecosystem Science Conference, Feb. 1-4, Tampa, FL.

**Murphy, D. W.**, Li, C., d'Albignac, V., Morra, D., and Katz, J. 2016. "Production of Oily Marine Aerosol by Raindrop Splashing." Gulf of Mexico Oil Spill and Ecosystem Science Conference, Feb. 1-4, Tampa, FL.

Xue, X., **Murphy, D. W.**, Sampath, K., and Katz, J. 2016. "Turbulent crude oil plume in crossflow: effect of vortex structures on oil residence in plume." Gulf of Mexico Oil Spill and Ecosystem Science Conference, Feb. 1-4, Tampa, FL.

**Murphy, D. W.**, Li, C., d'Albignac, V., Morra, D., and Katz, J. 2015. "Turbulent crude oil jets in crossflow: holographic measurements of droplet size distributions." American Physical Society. 68<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, November 22-24, Boston, MA.

Xue, X., **Murphy, D. W.**, and Katz, J. 2015. "Droplet impact onto an immiscible floating oil layer: splash behavior and droplet sizes." American Physical Society. 68<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, November 22-24, Boston, MA.

**Murphy, D. W.**, Li, C., d'Albignac, V., Morra, D., and Katz, J. 2015. "High Weber number impacts onto immiscible oil layers: splash behavior and droplet sizes." *Droplets 2015*, Oct. 6-8, University of Twente, The Netherlands.

Katz, J., **Murphy, D. W.**, and Li, C. 2015. "Oily marine aerosol production by raindrop splashing." Gulf of Mexico Oil Spill and Ecosystem Science Conference, Feb. 16-19, Houston, TX.

**Murphy, D. W.**, Xue, X., and Katz, J. 2015. "Turbulent crude oil jets in crossflow." Gulf of Mexico Oil Spill and Ecosystem Science Conference, Feb. 16-19, Houston, TX.

**Murphy, D. W.**, Adhikari, D., Webster, D., and Yen, J. 2015. "Kinematics and hydrodynamics of swimming *Limacina helicina* using tomographic particle image velocimetry." Microscale Ocean Biophysics Conference, January 12-16, Aspen, CO.

**Murphy, D.W.**, Li, C. and Katz, J. 2014. "High speed drop impact on floating oil layers: splash behavior and oily marine aerosol production." American Physical Society. 67<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, November 23-25, San Francisco, CA.

*Morra, D.*, **Murphy, D.W.** and Katz, J. 2014. "Impact of small raindrops on crude oil slicks." American Physical Society. 67<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, November 23-25, San Francisco, CA.

**Murphy, D. W.**, and Katz, J. 2014. "The effect of chemical dispersant on the behavior of crude oil plumes in crossflow." AGU Ocean Sciences Meeting, Feb. 23-28, Honolulu, HI.

**Murphy, D.W.** Li, C. and Katz, J. 2014. "Oily marine aerosol production by impacting raindrops." Gulf of Mexico Oil Spill and Ecosystem Science Conference, Jan. 26-29, Mobile, AL

**Murphy, D. W.**, *Morra, D.* and Katz, J. 2013. "Rain drops and oil slicks: impact of water droplets on a surface oil layer." American Physical Society. 66<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, November 24-26, Pittsburgh, PA.

Katz, J., **Murphy, D.W.**, and *Morra, D.* 2013. "Large scale behavior and droplet size distributions in crude oil jets and plumes." American Physical Society. 66<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, November 24-26, Pittsburgh, PA.

Yen, J., **Murphy, D. W.**, *Fan, L.*, Skipper, A. and Webster, D. R. 2013. "High Speed Tomographic PIV Measurements of Copepod Sensitivity to a Suction Feeding Predator Mimic." American Physical Society. 66<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, November 24-26, Pittsburgh, PA.

**Murphy, D. W.** and Katz, J. 2013. "Rain drops and oil slicks." 5<sup>th</sup> Annual Atmosphere-Ocean Science Days, June 6-7, Baltimore, MD.

**Murphy, D. W.**, Webster, D. R., and Yen, J. 2013. "Swimming and Sensing: High-speed tomographic PIV measurements of zooplankton behavior." Microscale Interactions in Aquatic Environments, March 10-15, Les Houches, France.

**Murphy, D. W.**, Webster, D. R., and Yen, J. 2012. "High speed hopping: time-resolved tomographic PIV measurements of water flea swimming." American Physical Society. 65<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, November 18-20, San Diego, CA.

Webster, D. R., **Murphy, D. W.**, and Yen, J. 2012. "High speed tomographic PIV measurements of copepod escape jumps." American Physical Society. 65<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, November 18-20, San Diego, CA.

Yen, J., **Murphy, D. W.**, and Webster, D. R. 2012. "Metachronal propulsion, hovering, and signaling: High speed tomographic PIV measurements of swimming Antarctic krill." American Physical Society. 65<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, November 18-20, San Diego, CA.

**Murphy, D. W.**, Webster, D. R. and Yen, J. 2012. "Copepod escape jumps: Tomo-PIV measurements of the eliciting hydromechanical signal and subsequent flow disturbance." Society of Integrative and Comparative Biology. Jan 3-7, Charleston, SC, USA.

*Kanagawa, M.*, **Murphy, D. R.**, Webster, D. R., Kawaguchi, S. King, R., and Yen, J. 2012. "Swarming to schooling transitions in Antarctic krill aggregations." Society of Integrative and Comparative Biology. Jan 3-7, Charleston, SC, USA.

**Murphy, D. W.**, Lasley, R., Webster, D. R., and Yen, J. 2011. "Feeling, following, feeding, fleeing: a copepod's life at low Reynolds number." American Physical Society. 64<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, November 20-22, Baltimore, MD. Gallery of Fluid Motion.

**Murphy, D. W.**, Zheng, L., Mittal, R., Webster, D. R. and Yen, J. 2011. "Sea butterfly swimming: time-resolved tomographic PIV measurements." American Physical Society. 64<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, November 20-22, Baltimore, MD.

Webster, D. R., **Murphy, D. W.**, and Yen, J. 2011. "High speed tomographic PIV measurements of copepod sensory cues." American Physical Society. 64<sup>th</sup> Annual Meeting of the Division of Fluid Dynamics, November 20-22, Baltimore, MD.

**Murphy, D. W.**, Webster, D. R., and Yen, J. 2011. "Escaping copepods: Tomographic PIV measurements." Southeast Regional Meeting of the Society of Integrative and Comparative Biology. Oct 22, Salem Winston, NC, USA.

*Middlemas, E.*, **Murphy, D. W.**, and Yen, J. 2011. "Hop-and-Sink Swimming kinematics of the water flea, *Daphnia pulicaria*." Southeast Regional Meeting of the Society of Integrative and Comparative Biology. Oct 22, Salem Winston, NC, USA.

**Murphy, D. W.**, Webster, D. R. and Yen, J. 2011. "Quantifying Zooplankton-Generated Flow via a High-Speed Tomographic PIV System." Microenvironments Modulating Biological Interactions in the Ocean, Jan 16-21, Aspen, CO.

**Murphy, D. W.**, Webster, D. R. and Yen, J. 2010. "A High Speed Tomographic PIV System for Measuring Plankton-generated Flow" American Physical Society. 63<sup>rd</sup> Annual Meeting of the Division of Fluid Dynamics, November 21-23, Long Beach, CA.

**Murphy, D. W.**, Webster, D. R. and Yen, J. 2010. "A High Speed Tomographic PIV System for Measuring Plankton-generated Flow." Southeast Regional Meeting of the Society of Integrative and Comparative Biology. Nov 6, Blacksburg, VA, USA.

**Murphy, D. W.**, Webster, D. R., Kawaguchi, S. King, R., Osborn, J., and Yen, J. 2010. "The Density and Structure of Antarctic Krill Schools" American Society of Limnology and Oceanography: Ocean Sciences Meeting, February 22-26, Portland, OR, USA.

*Kabir, N.*, **Murphy, D. W.**, Webster, D. R., Kawaguchi, S., King, R., Osborn, J., and Yen, J. 2010. "Comparison of locomotory biomechanics of Antarctic and Pacific krill." American Society of Limnology and Oceanography: Ocean Sciences Meeting, February 22-26, Portland, OR, USA.

**Murphy, D. W.**, Webster, D. R., Kawaguchi, S., King, R., Osborn, J., and Yen, J. 2010. "Krill Schooling: Defining the Structure of Antarctic Krill Schools and Swarms" Society of Integrative and Comparative Biology. January 3-8, Seattle, WA, USA

**Murphy, D. W.**, Webster, D. R., Kawaguchi, S., King, R., Osborn, J., and Yen, J. 2009. "Effects of size and viscosity on the biomechanics of krill locomotion." Southeast Regional Meeting of the Society of Integrative and Comparative Biology. September 26, Chapel Hill, NC, USA.

*Bloomquist, M.*, **Murphy, D. W.**, Webster, D. R., Kawaguchi, S., King, R., Osborn, J., and Yen, J. 2009. "Schooling in Antarctic krill." Southeast Regional Meeting of the Society of Integrative and Comparative Biology. September 26, Chapel Hill, NC, USA.

**Murphy, D. W.**, Webster, D. R., Kawaguchi, S., King, R., Osborn, J., Sotiropoulos, F., and Yen, J. 2009. "Kinematics of various swimming modes in Antarctic krill." 3<sup>rd</sup> GLOBEC Open Science Meeting, June 22-26, Victoria, BC, Canada.

**Murphy, D. W.**, Webster, D. R., Kawaguchi, S., King, R., and Yen, J. 2009. "Locomotory biomechanics of Antarctic krill." Society of Integrative and Comparative Biology. January 3-7, Boston, MA, USA.

**Murphy, D. W.**, Dasi, L. P., Glezer, A., and Yoganathan, A. 2008. "Reduction of flow-induced blood damage in bileaflet mechanical heart valves through passive flow control." ASME 2008 Summer Bioengineering Conference, June 25-29, Marco Island, FL.

**Murphy, D. W.**, Dasi, L., Yoganathan, A., Glezer, A. 2006. "Effect of vortex generators on the closing transient flow of bileaflet mechanical heart valves." American Physical Society. 59th Annual Meeting of the Division of Fluid Dynamics, November 19-21, Tampa Bay, USA.

**GRANT SUPPORT** Source: National Science Foundation Polar Program; Amount: \$37,747; Title: SUPP: INTERN: Collaborative Research: Individual Based Approaches to Understanding Krill Distributions and Aggregations; Type: INTERN Supplement; Role: PI; Start and End Dates: 8/1/2019 – 7/31/2022



Source: USF COVID-19 Rapid Response Grant; Amount: \$25,000 (\$16,350 to Murphy); Title: Dispersion Modeling of Respiratory Aerosols and COVID-19 Infection Risk Analysis in Airport Terminals; Type: Internal Award; Role: co-PI; Collaborators: Andres Tejada-Martinez (PI; USF); Start and End Dates: 8/1/2020 – 7/31/2021

Source: USF Internal Awards; Amount: \$10,000; Title: Development of a Novel Flow Measurement System for Shallow Coastal Waters; Type: New Researcher Grant; Role: PI; Start and End Dates: 5/1/2020 – 4/30/2021

Source: National Science Foundation Polar Program; Amount: \$35,921; Title: SUPP: INTERN: Collaborative Research: Individual Based Approaches to Understanding Krill Distributions and Aggregations; Type: INTERN Supplement; Role: PI; Start and End Dates: 8/1/2019 – 7/31/2022

Source: National Science Foundation Polar Program; Amount: \$197,933; Title: Collaborative Research: Individual Based Approaches to Understanding Krill Distributions and Aggregations; Type: Research Award; Role: PI; Start and End Dates: 8/1/2019 – 7/31/2022

Source: National Science Foundation Fluid Dynamics Program; Amount: \$4,000; Title: SUPP: CAREER: Aerial and Aquatic Flapping Flight at Low Reynolds Numbers; Type: Student Design Supplement; Role: PI; Start and End Dates: 2/15/2019 – 1/31/2024

Source: National Science Foundation Fluid Dynamics Program; Amount: \$16,000; Title: REU: SUPP: CAREER: Aerial and Aquatic Flapping Flight at Low Reynolds Numbers; Type: REU Supplement; Role: PI; Start and End Dates: 2/15/2019 – 1/31/2024

Source: National Science Foundation Fluid Dynamics Program; Amount: \$520,000; Title: CAREER: Aerial and Aquatic Flapping Flight at Low Reynolds Numbers; Type: Research Award; Role: PI; Start and End Dates: 2/15/2019 – 1/31/2024

Source: USF Internal Award; Amount: \$2405; Title: Faculty International Travel Grant; Type: Internal Award; Role: PI; Start and End Dates: 1/10/2019 – 1/17/2019

Source: Florida Institute of Oceanography; Amount: \$2000; Title: Biological Fluid Mechanics Class Visit to Keys Marine Lab; Type: FIO Shiptime Proposal; Role: PI; Start and End Dates: 7/1/2018 – 6/30/2019

Source: USF Internal Award; Amount: \$9500; Title: Sea Butterfly Swimming: Bio-Inspiration for Aquatic Micro-Aerial Vehicles; Type: USF Nexus Initiative (UNI) Award; Role: PI; Start and End Dates: 8/1/2018 – 7/31/2019

Source: Gulf of Mexico Research Initiative; Amount: \$999,185 (~\$169,909 to Murphy); Title: Turbulent Vertical Mixing and the Formation of Oil Particle Aggregates: LES, Measurements, and Modeling; Type: Research Award; Role: co-PI;

Collaborators: Andres Tejada-Martinez (PI; USF), Michel Boufadel (co-PI; NJIT), Arnoldo Valle-Levinson (co-PI; UF); Start and End Dates: 1/1/2018 – 12/31/2019

Source: Bermuda Institute of Ocean Sciences; Amount: \$2289; Type: Grant in Aide; Role: PI; Date: 5/2018

Source: National Academies of Sciences, Engineering and Medicine Gulf Research Program; Amount: \$75,000; Title: Formation, Exposure Pathways, and Health Effects of Oily Marine Aerosol; Type: Early-Career Research Fellowship; Role: PI; Start and End Dates: 9/1/2017 – 12/31/2019

Source: National Academies Keck Futures Initiative; Amount: \$75,000 (\$38,295 to Murphy); Title: Swimming in Sea Butterflies: Physics, Physiology, Ecology, Art, and Design Inspiration for an Aquatic Micro-Aerial Vehicle; Type: Seed Grant; Role: co-PI; Collaborators: Amy Maas, Bermuda Institute for Ocean Sciences; Start and End Dates: 9/1/2017 – 6/1/2019

Source: National Academies Keck Futures Initiative; Amount: \$50,000 (\$21,200 to Murphy); Title: Swimming across Scales: Metachronal Rowing in the Deep Blue Sea; Type: Seed Grant; Role: co-PI; Collaborators: Margaret Byron, Penn State; Start and End Dates: 9/1/2017 – 6/1/2019

Source: USF Internal Awards; Amount: \$7658; Title: Swimming in Sea Butterflies: Fluid Dynamics, Ecology, and Bio-Inspired Design; Type: New Researcher Grant; Role: PI; Start and End Dates: 5/1/2017 – 4/30/2018

Source: Bermuda Institute of Ocean Sciences; Amount: \$4000; Type: Grant in Aide; Role: PI; Date: 5/2017

**POSTDOC  
MENTORING**

Carlowen Smith (Fall 2018 – Spring 2020)

**GRADUATE  
MENTORING**

Abdullah Aldaddi (Fall 2021 - present)  
Joe Elghossein (Summer 2021)  
Evan Williams (Fall 2020 - present)  
Kuvvat Garayev (Spring 2018 – present)  
Sanjib Gurung (Spring 2018 – Fall 2022)  
Ali Al Shamrani (Fall 2018 – Summer 2022)  
Sindhu Reddy Mutra (Fall 2020 – Summer 2021)  
Ali Al Dasouqi (Fall 2017 – Spring 2021)  
Ferhat Karakas (Spring 2017 – Fall 2020)  
Ahmet Topcuoglu (Spring 2018 – Summer 2019)  
Zongze Li (Fall 2018 – Summer 2019)  
Mickael Abdillahi (Summer 2015)

**UNDERGRADUATE  
MENTORING**

-Khadijah Shamim (Spring 2022 – present)  
-Shreeram Panth (Fall 2020 – Fall 2021)  
-Stefano Mahairas (Summer 2020-Fall 2020)

- Tristen Mee (Fall 2019 – Fall 2020)
- Azher Hamid (Summer 2020-Fall 2020)
- Mumtaz Hassan (Summer 2020-Fall 2021)
- Shankar Singh (Summer 2019-Summer 2020)
- Ryan Ward (Fall 2019)
- Muhammad Shaikh (Fall 2019 – Spring 2020)
- Josh Arandia (Fall 2018 – Fall 2020)
- Daniel D’Oliveria (Summer 2018 – Spring 2019)
- Aum Patel (Fall 2017 – Spring 2019)
- \*Daniel Olsen (Fall 2016 – Summer 2018) – Now a PhD student at Georgia Tech
- Joseph Bello (Spring 2017 – Spring 2018)
- Alejandro Guerra (Summer 2017 – Fall 2018)
- Paola Rossi (Spring 2017 – Summer 2018)
- Kyle Candela (2013-2015)
- Alex Naticchia (2014-2015)
- Ben Chello: (2013)
- Ben Keyser: (2014)
- Vincent d’Albignac (Spring – Summer 2015)
- David Morra (2013 – 2014)
- \*Lin Fan (Spring – Summer 2012) – NSF Graduate Fellowship Recipient
- \*Eleanor Middlemas (Summer – Fall 2011) – NSF Graduate Fellowship Recipient
- Marleen Kanagawa (Fall 2010 – Summer 2012)
- Thanh Nguyen (Summer – Fall 2010)
- Nadir Kabir (Fall 2009 – Summer 2010)
- Megan Bloomquist (Summer – Fall 2009)
- Morgan Stephenson (Spring 2009)

**HIGH SCHOOL MENTORING**

- Lambert Aryee (Fall 2013 – Spring 2014): won 4<sup>th</sup> prize in Environmental Science at International Science and Engineering Fair
- Alexander McIntyre (Spring 2011)
- Lisa Dinh (Summer 2011)

**WORK EXPERIENCE**

**Southern Company, Birmingham, AL** **2000 – 2004**

- Student Engineer in Research and Environmental Affairs Division
- Performed research into chemical composition and aerodynamic properties of ash
- Maintained coal quality database and assisted with toxic release inventory reporting

**POPULAR PRESS**

- Research on the swimming and sinking of sea butterflies featured on several sites, <https://www.sciencenews.org/article/sea-butterfly-marine-snail-shells-swim> and <https://scitechdaily.com/fluid-physics-of-movement-in-marine-snails-could-lead-to-novel-bio-inspired-underwater-vehicles/> in Fall 2020
- Bubble bursting research featured on home page of Science Magazine and at <https://www.sciencemag.org/news/2019/11/bursting-bubbles-blow-smoke-rings> in November 2019
- Sea butterfly research featured on The Discovery Channel Show “The Daily Planet” in October 2017.
- Wrote entry on Sea Butterflies for *World Book* children’s encyclopedia (2017)

- Sea butterfly research featured in 100+ national and international media outlets (*New York Times ScienceTake* video, BBC News, NPR, *Washington Post*, *Slate*, *Popular Science*, *Scientific American*, *New Scientist*, *The Christian Science Monitor*, *Daily Mail*, etc...) in February 2016
- Oil spill research featured in documentary film *Journey to Planet Earth: Dispatches from the Gulf*, narrated by Matt Damon (2016)

**SCIENTIFIC  
OUTREACH**

- Skyped with AP Physics class at Middleton High School while performing research at Palmer Station, Antarctica (Nov. 18, 2019)
- Presented research on sea butterfly swimming and answered questions about undergraduate engineering in the AP Physics class at Middleton High School (Oct. 22, 2019)
- Lab presented research on sea butterfly swimming to the public at the Clearwater Aquarium Marine Science Fest (Feb. 20, 2018 & Feb. 17, 2019 & Feb. 16, 2020)
- Presented animal swimming research to 5<sup>th</sup> graders as part of the Great American Teach-in at Temple Terrace Elementary School (November 17, 2016)

**ACADEMIC  
SERVICE**

- Editorial Board Member for *Scientific Reports* (2019-present)
- Session Chair for “Biological Fluid Dynamics: Flying Insects” session at 2021 APS DFD conference in Phoenix, AZ
- Co-organizer for Symposium on “Metachronal coordination of multiple appendages for swimming and pumping” at 2021 Society for Integrative and Comparative Biology conference, January 7, 2021, Washington, D.C. (Virtual meeting)
- Session Chair for “Social Behavior” session at 2021 SICB conference in Washington, D.C. (Virtual meeting)
- Co-editor for special issue of *Frontiers in Marine Science* (Small scale spatial and temporal patterns in particles, plankton, and other organisms; 2019-2021)
- Co-Organizer for session on “Small scale spatial and temporal patterns in particles, plankton, and other organisms” at 2019 ASLO Aquatic Sciences Meeting, Feb. 23 – March 2, 2019, San Juan, Puerto Rico.
- Session Chair for “Living and Moving in Groups” session at 2019 SICB conference in Tampa, FL
- Session Chair for “Biological Fluid Dynamics: Locomotion swimming – Invertebrates” session at 2018 APS DFD conference in Atlanta, GA
- Session Chair for Swimming VI session at 2017 APS DFD conference in Denver, CO

**DEPARTMENTAL  
SERVICE**

- Interview Panel (Faculty Search Committee) for USF Department of Mechanical Engineering (2019; 2021)
- Fluid Dynamics Qualifying Exam Committee (Member: 2017-present; Chair: 2019-present)