

CURRICULUM VITAE

MICHAEL S. TWARDOWSKI

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PROFESSIONAL PREPARATION

Postdoc	Environmental Optics Fellowship, <i>Oregon State University</i>	1998-1999
Ph.D.	Oceanography, <i>University of Rhode Island</i>	1998
B.S.	Biology with Honors, <i>Trinity University, San Antonio, Texas</i>	1992

RECENT APPOINTMENTS

Edwin A. Link Ocean Technology and Defense Endowed Professor, <i>Harbor Branch Oceanographic Institute, FAU</i>	2026-present
Director, <i>Center for Marine Applied Technology and Engineering (C-MATE)</i>	2021-present
Research Professor, <i>Harbor Branch Oceanographic Institute, FAU</i>	2015-present
Program Lead, Maritime Sensing, <i>I-SENSE, FAU</i>	2016-present
Affiliate Professor, <i>Ocean Engineering, FAU</i>	2017-present
Affiliate Professor, <i>Dept. Biological Sciences and Graduate College, FAU</i>	2018-present
President, <i>Sunstone Scientific LLC</i>	2018-present
Senior Engineer, <i>SEACORP Inc.</i>	2015-present
Associate Director, <i>NOAA Cooperative Institute, CIOERT, HBOI</i>	2018-2020
Director of Research and Vice President, <i>WET Labs, Inc.</i>	2005-2015

Postdoctoral Advisors: Drs. Ronald Zaneveld and Timothy Cowles (Oregon State Univ.)

Ph.D. Advisor: Percy Donaghay (University of Rhode Island)

- Leads a research team in oceanographic research, specializing in ocean optics
- Develops optical sensors for oceanographic research
- NASA PACE Mission, Science Team, 2015-present
- Top Security clearance; HBOI is a DHS designated research facility
- Over \$40M in externally funded research

PROFESSIONAL AWARDS

WET Labs Postdoctoral Fellowship, 1998.

Early Career Faculty Award, Office of International Research and Development, Oregon State University, 2000.

ASEE Visiting Faculty Fellowship, Naval Research Labs, Stennis Space Center (R. Arnone, A. Weidemann) and Washington, D.C., (Curt Davis), 2000.

Adjunct Professor, University of Rhode Island, 2003.

Adjunct Professor, University of Connecticut, 2005.

Spinoff technology selection, NASA Innovative Partnership Program,
<http://www.sti.nasa.gov/tto/Spinoff2005/PDF/accessible.pdf>, 2005.

NASA, Distinguished Science Award, GASEX, 2008.

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NATO Visiting Research Fellowship, Naval Underwater Research Centre, La Spezia, Italy, 2010.
NASA PACE Science Team, 2015-2019.
Visiting Scientist Fellowship, LOG, Wimereux, France, 2017.
Visiting Scientist Fellowship, CNR-ISAC, Frascati, Italy, 2018.
Love Your Lagoon Honoree, HBOI Foundation, 2018.
Visiting Scientist Fellowship, CNR-ISAC, Frascati, Italy, 2019.
Environmental Stewardship Award, Florida Center of Coastal and Human Health, HBOI-FAU (I was one of the Lead PIs), Keep Martin Beautiful (Non-Profit), 2019.
Technology and Innovation Award, Florida Center of Coastal and Human Health, HBOI-FAU (I was one of the Lead PIs), Keep Martin Beautiful (Non-Profit), 2019.
Researcher of the Year, Professor level, FAU, 2020.
Robert H. Goddard Honor Award for The Plankton, Aerosol, Cloud, ocean Ecosystem (PACE) Project Science Team, 2022.
“Top 2% of scientists worldwide,” Stanford/Elsevier ranking, 2025.

PATENTS

Twardowski, M., and J. Sullivan. 2014. Digital holographic microscopy apparatus and method for clinical diagnostic hematology. PATENT US 20140220622 A1.

PUBLICATIONS: PEER-REVIEWED (reverse chronological)

(10001 citations; *h-index* 50; *i10 index* 90 as of Sep 26, 2026)

- 129 Twardowski, M. 2026. The science of light and life underwater. *In*: Trigger: Oceanographies Collective, A publication for reflection on photography by Fotomuseum Antwerpen (FOMU); Nuria Bofarull and Irene Solé Quevedo [Guest Eds.], published by Fw: Books (www.fw-books.nl), Amsterdam, NL, pp. 80-89.
- 128 Tanweer, S., M. Sharma, A.R. Nayak, E. Malkiel, M. Twardowski, and S. Verma. 2026. The influence of body anisotropy on wake characteristics and enstrophy production for prolate ellipsoids at $Re_D = 10,000$. *J. Fluid Mechanics*, doi:10.1017/jfm.2026.11367.
- 127 Salam, Twardowski, and OTHERS. 2026. A compilation of global bio-optical in situ data for ocean-colour satellite applications – version four. *Earth System Science Data*, <https://doi.org/10.5194/essd-2026-539>.
- 126 Capalbo, A., F. Letendre, A. Langner, A. Blackburn, O. Dillahay, and M. Twardowski. 2026. End-to-End Segmentation and Classification of Zooplankton Using Shadowgraphy and Convolutional Neural Networks. *Sensors*, doi.org/10.3390/s26061824.
- 125 Letendre, F., A. Blackburn, and M.S. Twardowski. 2025. Linking peak intensity of mechanically stimulated bioluminescence and cell surface area in dinoflagellates. *Biol Open* 14(9):bio062190.
- 124 Blocker, E.R, J.D Hedley, and M.S. Twardowski. 2025. Neutral Lines and Model-Measurement Closure in Oceanic Polarized Light Fields. *Optics Express*, 33, 26187-26214.
- 123 D’Alimonte, D. T. Kajiya, J. Pitarch, V. Brando, M. Talone, C. Mazeran, M. Twardowski, S. Kolluru, A. Tonizzo, E. Kwiatkowska, D. Dessailly, and J. I. Gossn. 2025. Comparison of correction methods for bidirectional effects in

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- ocean color remote sensing. *Remote Sensing of Environment*, article number 114606.
- 122 Collister B., J. Hair, C. Hostetler, A. Cook, A. Ibrahim, E. Boss, A. J. Scarino, T. Shingler, W. Slade, M. **Twardowski**, M. Behrenfeld and I. Cetinić. 2024. *Remote Sensing of Environment* 300:113898. doi: 10.1016/j.rse.2023.113898.
- 121 Letendre F, Blackburn A, Malkiel E, **Twardowski** M. 2024. Using bioluminescence as a tool for studying diversity in marine zooplankton and dinoflagellates: an initial assessment. *Peer-J* 12:e17516 <http://doi.org/10.7717/peerj.17516>.
- 120 Letendre F, **Twardowski** M, Blackburn A, Poulin C and Latz MI. 2024. A review of mechanically stimulated bioluminescence of marine plankton and its applications. *Front. Mar. Sci.* 10:1299602. doi: 10.3389/fmars.2023.1299602.
- 119 Lopez, O., A. Ernce, B. Ouyang, E. Malkiel, C. Gong, and M.S. **Twardowski**. 2024. Advancements in Remote Compressive Hyperspectral Imaging: Adaptive Sampling with Low-Rank Tensor Image Reconstruction. *Electronics*, 13, 2698. <https://doi.org/10.3390/electronics13142698>.
- 118 Moore, T.S., S. Kolluru, A. Tonizzo, and M.S. **Twardowski**. 2024. Bio-optical inversion scheme based on the radiative transfer equation. *Optics Express*, 32(23): 41270-41296.
- 117 Blackburn, A., F. Letendre, C. Poulin, E. Malkiel, M. Latz, and M. **Twardowski**. 2023. Bioluminescence emission characteristics of the ctenophore Mnemiopsis leidyi. *SPIE Proceedings*.
- 116 Kolluru, S., Michael S. **Twardowski**, and Shirishkumar S. Gedam. 2023. Optimization of the Generalized Inherent Optical Property (GIOP) Inversion Model for Ocean Color Remote Sensing, *SPIE Proceedings*.
- 115 Ottaviani, M., M. **Twardowski**, E. Fry, M. Dewey, C. Orrico, and N. Stockley. 2023. Calibration and performance of a new integrated underwater scattering and backscattering sensor. *SPIE Proceedings*.
- 114 Strait, C., A. Tonizzo, M. **Twardowski**, and Rudiger Rottgers. 2023. Evaluating uncertainties and a new black plastic calibration method for the PSICAM. *SPIE Proceedings*.
- 113 Tonizzo, A., M. **Twardowski**, S. Kolluru, A. Gleason, and K. Voss. 2022. Evaluating a new semi-analytical BRDF correction for ocean color. *Oceans from Space, Proceedings*.
- 112 Tonizzo, A., M. **Twardowski**, S. Kolluru, A. Gleason, and K. Voss. 2022. Evaluating the BRDF correction for a new semi-analytical model using field measurements. *International Radiation Symposium Proceedings*.
- 111 Valente, A., M. **Twardowski**, and Others. 2022. A compilation of global bio-optical in situ data for ocean color satellite applications – version three. *Earth Science Systems Data*, in press.
- 110 Kostakis, I., M. **Twardowski**, C. Roesler, R. Rottgers, D. Stramski, D. McKee, A. Tonizzo, and S. Drapreau. 2021. Hyperspectral optical absorption closure experiment in complex coastal waters. *Limnology and Oceanography Methods*, doi: 10.1002/lom3.10447.
- 109 Laureano-Rosario, A., M. **Twardowski**, and Others. 2021. Dynamics of microcystins and saxitoxin dynamics in the Indian River Lagoon, Florida. *Harmful Algae*, 103:102012.
- 108 Nayak, A., E. Malkiel, M. McFarland, M. **Twardowski**, and J. Sullivan. 2021. A review of holography in the aquatic sciences: *in situ* characterization of particles, plankton, and small scale biophysical interactions. *Frontiers of Marine Science*, 7:572147.

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- 107 Zhai, S., and M.S. Twardowski. 2021. Degree of linear polarization for suspended particle fields from diverse natural waters. *Frontiers in Remote Sensing*, doi: 10.3389/frsen.2021.735512.
- 106 Guo, Nyman, Nayak, Mallery, Yu, Yuan, Barua, Milmore, McFarland, **Twardowski**, Sullivan, Hong. 2020. Automated plankton hologram classification with deep convolutional neural networks. *Limnology and Oceanography Methods*, doi: 10.1002/lom3.10402.
- 105 McFarland, M., A. Nayak, N. Stockley, M. **Twardowski**, and J. Sullivan. 2020. Enhanced light absorption by horizontally oriented diatom colonies modeled from in situ holographic video. *Frontiers in Marine Science*, doi.org/10.3389/fmars.2020.00494.
- 104 McKenzie, T., M. **Twardowski**, N. Briggs, A. Nayak, K. Boswell, and F. Dalgleish. 2020. Three-dimensional imaging lidar technology for characterizing particle fields and organisms in the mesopelagic ocean. *Frontiers in Marine Science*, 7:558745, doi:10.3389/fmars.2020.558745.
- 103 Nayak, A., and M. **Twardowski**. 2020. ‘Breaking’ news: Particle fragmentation is a missing piece of the ocean carbon budget. *Science*, 367(6479):738-739. doi: 10.1126/science.aba7109
- 102 Zhai, S., M. Twardowski, J.D. Hedley, M. McFarland, A.R. Nayak, and T. Moore. 2020. Optical backscattering and linear polarization properties of the colony forming cyanobacterium *Microcystis*. *Optics Express*, 26(25):37149-37166.
- 101 Boss, E., M. **Twardowski**, D. McKee, I. Cetinic, and W. Slade. 2019. Beam transmission and attenuation coefficients: instruments, characterization, field measurements, and data analysis protocols. In: A. Neely (Ed.), NASA Ocean Optics Protocols, Vol I, Inherent Optical Property Measurements and Protocols, pp. 22-36.
- 100 Chowdary, J., P. Zhai, F. Xu, H. Dierssen, A. Ibrahim, R. Frouin, L. Remer, E. Boss, M. **Twardowski**, and X. Zhang. 2019. Radiative transfer in oceanic-atmospheric coupled systems. *Frontiers in Marine Science*, 7, 100; DOI: 10.3389/feart.2019.00100.
- 99 Moore, T.S, J.H. Churnside, J. Sullivan, M. **Twardowski**, A. Nayak, M. McFarland, N. Stockley, R. Gould, T. Johengen, and S. Ruberg. 2019. Vertical distributions of blooming cyanobacteria populations in a freshwater lake from lidar observations. *Remote Sensing of Environment*, 225:347-367.
- 98 Ouyang, B., M. **Twardowski**, F. Caimi, C. Gong, and Y. Li. 2019. Prototyping a compressive line sensing hyperspectral imaging sensor. Proc. SPIE 10932, Emerging Digital Micromirror Device Based Systems and Applications XI, 109320U; <https://doi.org/10.1117/12.2511981>.
- 97 **Twardowski**, M., and A. Tonizzo. 2019. Correction: Twardowski, M.; Tonizzo, A. Ocean Color Analytical Model Explicitly Dependent on the Volume Scattering Function. *Applied Sciences* 2018, 8, 2684. *Applied Sciences*, 9(5): 938; <https://doi.org/10.3390/app9050938>.

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- 96 Valente, A., M. **Twardowski**, and OTHERS. 2019. A compilation of global bio-optical in situ data for ocean color satellite applications – version two. *Earth Science Systems Data*, 11:1037-1068; <https://doi.org/10.5194/essd-11-1037-2019>..
- 95 Agaliate, J., R. Rottgers, M. **Twardowski**, and D. McKee. 2018. Evaluation of a flow cytometry method to determine size and real refractive index distributions in natural marine particle populations. *Applied Optics*, 57(7):1705-1716.
- 94 Figueroa, E., M. Cone, C. Orrico, M. Dewey, A. Derr, M. **Twardowski**, and E. Fry. 2018. Integrating Cavity Device Measuring the Optical Backscattering Coefficient in Fluid. *Applied Optics*, 57(24):6943-6951.
- 93 Gleason, A., Voss, K., H. Gordon, and M. **Twardowski**. 2018. Measuring and modeling the polarized upwelling radiance distribution in clear and coastal waters. *Applied Sciences, special issue on Ocean Optics*, 8, 2683; doi:10.3390/app8122683.
- 92 Lefering, I. R. Rottgers, C. Utschig, M. **Twardowski**, and D. McKee. 2018. Measurement uncertainties in PSICAM and reflective tube absorption meters. *Optics Express*, 26(19):24384-24402.
- 91 Nayak, A., M. McFarland, M. **Twardowski**, and J. Sullivan. 2018. On plankton distributions and biophysical interactions in diverse coastal and limnological environments. *Proc. SPIE, Ocean Sensing and Monitoring X*, DL 10631.
- 90 Ottaviani, M., R. Foster, A. Gilerson, A. Ibrahim, C. Carrizo, A. El-habashi, B Cairns, J. Chowdhary, C. Hostetler, J. Hair, S. Burton, Y. Hu, M. **Twardowski**, N. Stockley, D. Gray, W. Slade, and I. Cetinic. 2018. Airborne and shipborne polarimetric measurements over open ocean and coastal waters: intercomparisons and implications for spaceborne observations. *Remote Sensing of the Environment*, 206, 375-390, doi:10.1016/j.rse.2017.12.015.
- 89 Ouyang, B., M. **Twardowski**, Y. Li, and F. Dalglish. 2018. Investigation of a compressive line sensing hyperspectral imaging sensor. *Proc. SPIE, Unconventional Imaging*, 106773Q; doi: 10.1117/12.2309937.
- 88 Ramirez-Perez, M., M. **Twardowski**, C.C. Trees, J. Piera, and D. McKee. 2018. Inversion of *in situ* absorption and attenuation measurements to estimate constituent concentrations in optically complex shelf seas. *Journal of Geophysical Research - Oceans*, DOI 10.1002/2017JC013453.
- 87 Strait, C., M. Twardowski, F. Dalglish, A. Tonizzo, and A. Vuorenkoski. 2018. Development and assessment of lidar modeling to retrieve IOPs. *Proc. SPIE, Ocean Sensing and Monitoring X*, DL 10631.
- 86 Tonizzo, A., B. Russell, J. Sullivan, and M. **Twardowski**. 2018. Propagation of bioluminescent signals to near-surface from mesopelagic waters. *Proc. SPIE, Ocean Sensing and Monitoring X*, DL 10631-41.
- 85 **Twardowski**, M., S. Freeman, S. Pegau, J.R.V. Zaneveld, J. Mueller, and E. Boss. 2018. Chapter 2: Reflective tube absorption meters. In: A. Neely (Ed.), *NASA Ocean Optics Protocols, Vol I, Inherent Optical Property Measurements and Protocols*, pp. 37-51.

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- 84 **Twardowski, M., C. Jamet, and H. Loisel.** 2018. Analytical model to derive suspended particulate matter concentration in natural waters by inversion of optical attenuation and backscattering. *Proc. SPIE, Ocean Sensing and Monitoring X*, DL 10631.
- 83 **Twardowski, M., R. Rottgers, and D. Stramski.** 2018. Chapter 1: The absorption coefficient, an overview. In: A. Neely (Ed.), *NASA Ocean Optics Protocols, Vol I, Inherent Optical Property Measurements and Protocols*, pp. 5-21.
- 82 **Twardowski, M., and A. Tonizzo.** 2018. Progress on a new analytical algorithm to retrieve inherent optical properties from ocean color remote sensing. *Proc. IGARSS*, 3540.
- 81 **Twardowski, M., and A. Tonizzo.** 2018. Ocean color analytical model explicitly dependent on the volume scattering function. *Applied Sciences, special issue on Ocean Optics* (feature publication), 8, 2684; doi:10.3390/app8122684.
- 80 Werdell, J., L.I.W. McKinna, E. Boss, S.G. Ackleson, S.E. Craig, W.W. Gregg, Z-P. Lee, S. Maritorena, C.S. Roesler, C.S. Rousseaux, D. Stramski, J.M. Sullivan, M.S. **Twardowski**, M. Tzortziou, X. Zhang. 2018. An overview of approaches and challenges for retrieving marine inherent optical properties from ocean color remote sensing. *Progress in Oceanography*, doi.org/10.1016/j.pocean.2018.01.001.
- 79 Zamankhan Malayeri, H., M. **Twardowski**, J. Sullivan, T. Moore, and H. Choi. 2018. Correlation of cyanobacterial harmful bloom monitoring parameters: A case study on western Lake Erie. *AIMS Environmental Science*, 2018, 5(1): 24-34. doi: 10.3934/environsci.2018.1.24.
- 78 Moore, T., C.B. Mouw, M. **Twardowski**, J. Sullivan, A. Burtner, A. Ciochetto, M. McFarland, A. Nayak, D. Palladino, N. Stockley, T. Johengen, A. Yu, S. Ruberg, A. Weidemann. 2017. Bio-optical properties in western Lake Erie during intense summertime algal blooms: impacts for remote sensing applications. *Frontiers in Marine Science*, 4(300):1:20, doi: 10.3389/fmars.2017.00300.
- 77 Nayak, A., M. McFarland, N. Stockley, M. **Twardowski**, and J. Sullivan. 2017. In situ particle characterization and evidence of ubiquitous particle orientation in the ocean using a submersible holographic imaging system. *Proc. SPIE, Ocean Sensing and Monitoring IX*, 101860C.
- 76 Nayak, A., M. McFarland, J. Sullivan, and M. **Twardowski**. 2017. Evidence for ubiquitous preferential particle orientation in representative oceanic shear flows. *Limnology and Oceanography*, doi: 10.1002/lno.10618.
- 75 Schulien, J., M.J. Behrenfeld, J. Hair, C. Hostetler, and M. **Twardowski**. 2017. Vertically- resolved phytoplankton carbon and net primary production from a High Spectral Resolution Lidar. *Optics Express*, 25(12):13577-13587.
- 74 Stockley, N.D., R. Rottgers, D. McKee, I. Lefering, J.M. Sullivan, and M.S. **Twardowski**. 2017. Assessing uncertainties in scattering correction algorithms for reflective tube absorption measurements made with a WET Labs ac-9. *Optics Express*, 25(24):A1139-A1153.

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- 73 Tonizzo, A., M. **Twardowski**, S. McLean, K. Voss, M. Lewis, and C. Trees. 2017. Closure and uncertainty assessment for ocean color reflectance using measured volume scattering functions and reflective tube absorption coefficients with novel correction for scattering. *Applied Optics*, 56(1):130-146.
- 72 **Twardowski**, M., and A. Tonizzo. 2017. Scattering and absorption effects on asymptotic light fields in seawater. *Optics Express*, 25(15):18122-18130.
- 71 Brady, P., A. Gilerson, G. Kattawar, J. Sullivan, M. **Twardowski**, H. Dierssen, M. Gao, K. Travis, R.I. Etheredge, C. Carrizo, Y. Gu, B. Russell, S. Zhao, and M. Cummings. 2016. Response to comment on “Open-ocean fish reveal an omnidirectional solution to camouflage in polarized environments.” *Science*, 353(6299):552, DOI: 10.1126/science.aaf5018.
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- 69 Hair, J., C. Hostetler, Y. Hu, M. Behrenfeld, C.F. Butler, D.B. Harper, R. Hare, R. Berkoff, A. Cook, J. Collins, N. Stockley, M. **Twardowski**, I. Cetinic, R. Ferrare, and T. Mack. 2016. Combined Atmospheric and Ocean Profiling from an Airborne High Spectral Resolution Lidar. *European Physical Journal Conferences*, 119:22001, DOI: 10.1051/epjconf/201611922001.
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- 66 **Twardowski**, M.S., J. Sullivan, and F. Dalglish. 2016. Novel technologies to study undisturbed particle fields in the ocean. *Sea Technology*, 57(2):15-19.
- 65 Valente, A., Sathyendranath, S., Brotas, V., Groom, S., Grant, M., Taberner, M., Antoine, D., Arnone, R., Balch, W. M., Barker, K., Barlow, R., Bélanger, S., Berthon, J.-F., Besiktepe, S., Brando, V., Canuti, E., Chavez, F., Claustre, H., Crout, R., Frouin, R., García-Soto, C., Gibb, S. W., Gould, R., Hooker, S., Kahru, M., Klein, H., Kratzer, S., Loisel, H., McKee, D., Mitchell, B. G., Moisan, T., Muller-Karger, F., O'Dowd, L., Ondrusek, M., Poulton, A. J., Repecaud, M., Smyth, T., Sosik, H. M., **Twardowski**, M., Voss, K., Werdell, J., Wernand, M., and Zibordi, G. 2016. A compilation of global bio-optical *in situ* data for ocean-colour satellite applications. *Earth Syst. Sci. Data Discuss.*, doi:10.5194/essd-2015-37.
- 64 Zamankhan, H, J. Westrick, F.R. Anscombe, R. Stumpf, T.T. Wynne, J. Sullivan, M.S. **Twardowski**, T. Moore, H. Choi. 2016. Chapter 3: Sustainable monitoring of algal blooms, *In: Sustainable Water*

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- Management and Technologies, D.H. Chen [Ed.], Taylor and Francis Group, Boca Raton, FL, pp. 65-90.
- 63 Brady, P., A. Gilerson, G. Kattawar, J. Sullivan, M. **Twardowski**, H. Dierssen, M. Gao, K. Travis, R.I. Etheredge, C. Carrizo, Y. Gu, B. Russell, S. Zhao, and M. Cummings. 2015. Open-ocean fish reveal an omnidirectional solution to camouflage in polarized environments. *Science*, 350(6263):965-969.
- 62 Jay, D.A., S.A. Talke, A. Hudson, and M. **Twardowski**. 2015. Estuary Turbidity Maxima Revisited: Instrumental Approaches, Remote Sensing, Modeling Studies, and New Directions. *In: Fluvial-Tidal Sedimentology, Developments in Sedimentology*, vol. 68, P. Ashworth, J. Best, and D. Parsons [Eds], Elsevier, pp. 49-109.
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- 59 Vuorenkoski, A.K., Dalgleish, F.R., **Twardowski**, M.S., Ouyang, B., and Trees. C. C. 2015. Semi-empirical inversion technique for retrieval of quantitative attenuation profiles with underwater scanning LIDAR systems. *Proc. SPIE 9459, Ocean Sensing and Monitoring VII*, 94590E-94590E6.
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- 55 Chang, G., C. Jones, M. **Twardowski**. 2013. Prediction of optical variability in dynamic nearshore environments. *Methods in Oceanography*, <http://dx.doi.org/10.1016/j.mio.2013.12.002>.
- 54 Gilerson, A., J. Stepinski, A. Ibrahim, A. Tonizzo, Y. You, J. Sullivan, M. **Twardowski**, H. Dierssen, B. Russell, M. Cummings, P. Brady, S. Ahmed, and G. W. Kattawar. 2013. Benthic effects on the polarization of light in shallow waters. *Applied Optics*, 52(36):8685-8705.
- 53 Randolph, K., H. Dierssen, M. **Twardowski**, A. Cifuentes-Lorenzen, and C. Zappa. 2013. Optical measurements of small deeply-penetrating bubble populations generated by breaking waves in the Southern Ocean.

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Measuring optical backscattering in water, *In: A. Kokhanovsky (Ed),
Light Scattering Reviews 7: Radiative Transfer and Optical Properties
of Atmosphere and Underlying Surface*, Springer Praxis Books, DOI
10.1007/978-3-642-21907-8_6, pp. 189-224.
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Sullivan, M. **Twardowski**, J. Rines, P. Donaghay. 2013.
Characterization of biophysical interactions in the water column using
in situ digital holography. *Marine Ecological Progress Series*, 473:29-
51, doi:10.3354/meps10049.
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variability in the near-surface and upper ocean. *Journal of Geophysical
Research*, doi:10.1029/2012JC007964.
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A. Weidemann, J-F Berthon, D. Clark, and Z-P Lee. 2012. Detailed
validation of ocean color bidirectional effects in various Case I and
Case II waters. *Optics Express*, 20(7), 7630-7645.
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2012. Determining oceanic particle size distributions and particle
composition: a new SEM-EDS protocol with validation and comparison
to other methods. *Journal of Atmospheric and Oceanic Technology*, 29,
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