Wade W. Grabow, Ph.D.

Associate Professor of Chemistry and Biochemistry
Seattle Pacific University,
3307 Third Ave. West, Suite 205
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Education

Doctor of Philosophy (Biochemistry)
University of California at Santa Barbara *Santa Barbara, CA* Jul 2012
Dissertation: *Design Principles of RNA-based Scaffolds for Applications in RNA Nanotechnology*
Supervisor: Prof. Luc Jaeger

Master of Divinity
Princeton Theological Seminary *Princeton, NJ* May 2008

Master of Science (Industrial Chemistry)
University of Central Florida *Orlando, FL* May 2004
Thesis: Method for Determinations of Singlet Oxygen Quantum Yields for New Fluorene-based Photosensitizers in Aqueous Media for the Advancement of Photodynamic Therapy
Supervisor: Prof. Kevin Belfield

Bachelor of Science (Chemistry)
United States Air Force Academy *Colorado Springs, CO* May 2001

Professional Experience

Associate Professor
Seattle Pacific University *Seattle, WA* Sep '17 - Present

Assistant Professor
Seattle Pacific University *Seattle, WA* Sep '12 – Aug '17

Adjunct Professor
Limestone College Gaffney, SC Mar ’12 – Aug '14

Synthetic Research Chemist
United States Air Force *Edwards AFB, CA* Jun '04 - Sep '06

Research & Development Contracting Officer
United States Air Force *Patrick AFB, FL* May '01 - Jun '04

Teaching Experience

Seattle Pacific University Fall 2012 - Present
University Seminar (USEM 1000)
Introduction to the Nature of Science (CHM 1110)
General Chemistry (CHM 1211 & CHM 1212)
Survey of General Chemistry (CHM 1310)
Survey of Biochemistry (CHM 1360)

Biochemistry II & III (CHM/BIO 4362 & CHM/BIO 4363)
University Scholars Faith and Science I (USCH 3910)

Adjunct Professor

Limestone College, South Carolina — Mar 2012 - Aug 2014
Science and Religion (RE/SC 201)

Adjunct Instructor

Santa Barbara City College — Fall 2010 & Fall 2011
General Chemistry Lab I &II (CHEM 155 & CHEM 156)

Teaching Assistant

University of California at Santa Barbara — Fall 2008 - Spring 2011
Biochemistry Lab (CHM 110L)
Biochemistry III (CHM 142C)
RNA World (CHM 143)
General Chemistry Lab I, II, & III (CHM 1AL, CHM 1BL, & CHM 1CL)

Service

2018 - Present University Faculty Affairs committee member
2017-2018 Volunteer with Turning Point after school program
2016 - Present Pre-Professional Health Sciences advisor
2014 - 2017 University Curriculum committee member
2013 - 2016 Erickson undergraduate research conference planning committee

Professional Societies

2017 - Present RNA Society
2014 - Present American Scientific Affiliation
2012 - Present American Chemical Society

Grants, Fellowships, and Awards

2017 Bridging the Two Cultures of Science and the Humanities II Fellowship ($18K)
2015 Murdock Charitable Trust, Program for Natural & Physical Sciences grant ($58K)
2015 Chemistry Department, Montana Family Endowment Research Grant ($12K)
2012 Chemistry Department, Montana Family Endowment Research Grant ($9.5K)
2012 SPU Faculty Research Grant ($5.5K)
2011 Jarrod Davidson Memorial Award, UCSB
2010 Graduate Fellowship Honorable Mention, NSF
2010 School for Scientific Thought Teaching Fellow, NSF
2008 Phi Upsilon Award, UCSB
2000 Academic All-American (Water polo)

Publications

Grabow, Wade W., and Grace E. Andrews. "On the Nature and Origin of Biological Information: The Curious Case of RNA." *BioSystems* (2019): 104031.

Mitchell, Charles, Polanco, Julio A.; DeWald, Laura; Kress, Dustin; Jaeger, Luc; Grabow, Wade W. "Responsive self-assembly of tectoRNAs with loop–receptor interactions from the tetrahydrofolate (THF) riboswitch." *Nucleic Acids Research* (2019) 47(12): 6439-6451.

O'Hara, Jack M.; Marashi, Dylan; Morton, Sean; Jaeger, Luc; and Grabow Wade W. "Optimization of the Split-Spinach Aptamer for Monitoring Nanoparticle Assembly Involving Multiple Contiguous RNAs." *Nanomaterials* (2019) 9(3): 378.

Sharma, Indra Mani; Rappe, Mollie C.; Addepalli, Balasubrahmanyam; Grabow, Wade W.; Zhuang, Zhuoyun; Abeysirigunawardena, Sanjaya C.; Limbach, Patrick A.; Jaeger, Luc; and Woodson, Sarah A. "A metastable rRNA junction essential for bacterial 30S biogenesis." *Nucleic Acids Research* (2018): 5182-5194.

Afonin, Kirill A.; Viard, Mathias; Koyfman, Alexey Y.; Martins, Angelica N.; Kasprzak, Wojciech K.; Panigaj, Martin; Desai, Ravi, Santhanam, Arti; Grabow, Wade W.; Jaeger, Luc; Heldman, Eliahu; Reiser, Jakob; Chiu, Wah; Freed, Eric O. Shapiro, Bruce A. "Multifunctional RNA Nanoparticles." *Nano Letters* (2014) 14(10): 5662-5671.

Rogers, Tucker A.; Andrews, Grant E.; Jaeger, Luc; Grabow, Wade W.; "Fluorescent Monitoring of RNA Assembly and Processing Using the Split-Spinach Aptamer." *ACS Synthetic Biology* (2014) 4(2): 162-166.

Grabow, Wade W.; Jaeger, Luc, "RNA Self-Assembly and RNA Nanotechnology." *Accounts of Chemical Research* (2014) 47: 1871-1880.

Grabow, Wade W.; Jaeger, Luc, "RNA modularity for synthetic biology." *F1000Prime Reports* (2013) 5:46.

Grabow, Wade W.; Zhuang. Zhuoyun; Shea, Joan-Emma; Jaeger, Luc. "The GA minor submotif as a case study of RNA modularity, prediction, and design." *Wiley Interdisciplinary Reviews: RNA* (2013) 4:2, 181-203.

Grabow, Wade W.; Zhuang. Zhuoyun; Swank, Zoe; Shea, Joan-Emma; Jaeger, Luc. "The Right Angle (RA) Motif: A Prevalent Ribosomal RNA Structural Pattern Found in Group I Introns." *Journal of Molecular Biology* (2012) 424(1-2):54-67.

Afonin, Kirill A.; Kireeva, Maria; Grabow, Wade W.; Kashlev, Mikhail; Jaeger, Luc; Shapiro, Bruce A. "Co-transcriptional Assembly of Chemically Modified RNA Nanoparticles Functionalized with siRNAs." *Nano Letters* (2012) 12 (10), 5192–5195.

Grabow, Wade W.; Jaeger, Luc "siRNA delivery: Loaded-up microsponges." *Nature Materials* (2012) 11, 268-269.

Grabow, Wade W.; Afonin, Kirill A.; Zakrevsky, Paul; Walker, Faye M.; Calkins, Erin R.; Geary, Cody; Kasprzak, Wojciech; Bindewald, Eckart; Shapiro, Bruce A.; Jaeger, Luc. "RNA-nanotechnology in nanomedicine". In S. Thomas, A. George & S. Mathew (Eds.), *Recent Advances in Nanomedicine and Drug Delivery*. Toronto: Apple Academics Press Inc. (2011).

Afonin, Kirill A.; Grabow, Wade W.; Walker, Faye M.; Bindewald, Eckart; Dobrovolskaia, Marina A. Shapiro, Bruce A.; Jaeger, Luc. "Design and self-assembly of siRNA functionalized RNA nanoparticles for use in automated nanomedicine." *Nature Protocols* (2011) 6, 2022-2034.

Grabow, Wade W.; Zakrevsky, Paul.; Afonin, Kirill A.; Chworos, Arkadiusz; Shapiro, Bruce A.; Jaeger, Luc. "Self-assembling RNA nanorings based on RNAI/II inverse kissing complexes." *Nano Letters* (2011) 11(2), 878-87.

Iacono, Scott T.; Vij, Ashwani; Grabow, Wade; Smith, Dennis W. Jr.; Mabry, Joseph M. "Facile Synthesis of Hydrophobic Fluoroalkyl Functionalized Silsesquioxane Nanostructures via Novel Corner-Capping Methodology." *Chemical Communications* (2007) 47, 4992-4.

Mabry, Joseph M.; Vij, Ashwani; Iacono, Scott T.; Grabow, Wade W. "Recent advances in fluorinated polyhedral oligomeric silsesquioxanes and POSS fluoropolymers." *Polymer Preprints* (2005) 46(2), 630.

Moody, Laura; Marchant, Darrell; Grabow, Wade; Mabry, Joseph M. "Determination of mechanical and surface properties of semi-crystalline polyhedral oligomeric silsesquioxane nanocomposites." *SAMPE Journal*; (2005).

*Underlined author's name represents undergraduate student authors

Patents

Shapiro, Bruce A.; Afonin, Kirill A.; Kireeva, Maria L.; Kashlev, Mikhail; Jaeger, Luc; Grabow, Wade W. "Co-transcriptional assembly of modified RNA nanoparticles" US Patent # 20150203842 A1; July 23, 2015.

Works Presented

O'Hara, Jack; Grabow, Wade W. "Integration of Split-Spinach and RNA Nanoring" Erickson Undergraduate Research Conference, Seattle, WA (2018).

Mitchell, Charles; Grabow, Wade W. "Characterization of a tertiary interaction found in the THF Riboswitch for RNA self-assembly" Erickson Undergraduate Research Conference, Seattle, WA (2018).

DeWald, Laura; Grabow Wade W. "Characterization of a tertiary interaction found in the THF Riboswitch" Erickson Undergraduate Research Conference, Seattle, WA (2016).

Kress, Dustin; DeWald, Laura; Grabow, Wade W. "Characterization of a tertiary interaction found in the THF Riboswitch." Erickson Undergraduate Research Conference, Seattle, WA (2015).

Marashi, Dylan; Rogers, Tucker; Grabow, Wade W. "Monitoring RNA nanoparticle assembly using a split-Spinach aptamer." Erickson Undergraduate Research Conference, Seattle, WA (2015).

Wilner, Kelli; Kress, Dustin; Grabow, Wade W. "Characterization of a Tertiary Interaction Found in THF Riboswitch." Murdock College Science Research Conference, Vancouver, WA (2014).

Rogers, Tucker; Andrews, Grant; Grabow, Wade W. ""Fluorescent Monitoring of RNA Assembly Using Split Spinach Aptamer." (Oral Presentation) Erickson Undergraduate Research Conference, Seattle, WA (2013).

Rogers, Tucker; Andrews, Grant; Grabow, Wade W. ""Fluorescent monitoring of RNA assembly and processing using split spinach aptamer." Murdock College Science Research Conference, Vancouver, WA (2013).

Rivera, Stephen; Chen, Ellerie; Grabow, Wade W. "Design of tectoRNA assembly system for the characterization of a tertiary interaction found in the tetrahydrofolate riboswitch." Erickson Undergraduate Research Conference, Seattle, WA (2012).

Grabow, Wade W.; Zakrevsky, Paul; Afonin, Kirill A.; Chworos, Arkadiusz; Shapiro, Bruce A.; Jaeger, Luc. "Programmable RNA nanoring as a novel siRNA packaging nanoparticle." Abstracts of Papers, 8th Annual Foundations of Nanoscience Meeting, Snowbird, UT (2011).

Grabow, Wade W.; Zakrevsky, Paul; Jaeger, Luc. "Programmable RNA nanoring as a novel siRNA packaging nanoparticle." Abstracts of Papers, 241st ACS National Meeting, Anaheim, CA (2011), MEDI-298.

Grabow, Wade W.; Severcan, Isil; Chworos, Arkadiusz; Shapiro, Bruce; Jaeger, Luc. "The design and characterization of an RNA nanoring for use in RNA interference drug delivery." Experimental Biology Conference, Anaheim, CA (2010), 655.2.

Mabry, Joseph M.; Vij, Ashwani; Viers, Brent D.; Grabow, Wade W.; Marchant, Darrell; Iacono, Scott T.; Ruth, Patrick N.; Vij, Isha. "Hydrophobic silsesquioxane nanoparticles and nanocomposite surfaces an overview of the synthesis and properties of fluorinated polyhedral oligomeric silsequioxanes (POSS) and fluorinated POSS nanocomposites." ACS Symposium (2007), 964 (Science and Technology of Silicones and Silicone-Modified Materials), 290-300.

Vij, Ashwani; Mabry, Joseph; Boatz, Jerry; Grabow, Wade; Iacono, Scott; Vij, Vandana; Haddad, Tim; Largo, Sherly. "Spectroscopy - structure correlation in modern materials: an aid when things sound too good to be true!" Spectroscopy of Modern Materials, XVIII International School on Physics and Chemistry of Condensed Matter, Bialowieza, Poland, (2006).

Grabow, Wade; Iacono, Scott T.; Vij, Ashwani; Mabry, Joseph M.; Smith, Dennis W. "Synthesis and characterization of fluorinated polyhedral oligomeric silsesquioxanes." Abstracts of Papers, 231st ACS National Meeting, Atlanta, GA (2006), INOR-040.

Mabry, Joseph M.; Vij, Ashwani; Iacono, Scott T.; Grabow, Wade. "Recent developments in POSS fluoropolymers." Abstracts of Papers, 230th ACS National Meeting, Washington, DC (2005), POLY-717.

Grabow, Wade; Hicks, Barry; Gardner, Kimberly A. "EPR Binding studies of a spin-labeled cisplatin analogue." Abstracts of Papers, 221st ACS National Meeting, San Diego, CA (2001), CHED-590.

**Underlined author's name represents the presenter