

Megan L. Bestwick, Ph.D.

Linfield University, Department of Chemistry
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Education & Post-Doctoral Training

September 2009 – July 2013

Yale University School of Medicine, New Haven, Connecticut
Postdoctoral Fellow, Department of Pathology

July 2004 – August 2009

University of Utah; Salt Lake City, Utah
Ph.D. in Biochemistry; Conferred December 2009

September 2001 – June 2002

University of Washington; Seattle, Washington
M.S. in Analytical Chemistry

September 1997 – March 2001

Southern Oregon University; Ashland, Oregon
American Chemical Society certified B.S. in Chemistry, *cum laude*

Academic & Research Experience

July 2019 – current

Associate Professor, Chemistry Department
Biochemistry & Molecular Biology Major Program Coordinator
Linfield University (formerly Linfield College), McMinnville, OR

Current Research Interests: My research interests focus on understanding biochemical processes within the cellular organelle mitochondria. Mitochondria are responsible for generating key molecules in energy metabolism, and many of the enzymes involved in this process are oxidation-reduction enzymes that require metals for their function. In particular, the terminal enzyme in the electron transport chain, cytochrome c oxidase, requires copper for its function. The utilization of copper for this process makes copper an essential metal, but too much cellular copper is toxic. A specific aim of my research is to understand these toxicity thresholds and subsequent effects on enzyme activity and production of reactive oxygen species. Many of the enzymes in the electron transport chain also have protein subunits encoded by DNA in the mitochondrial matrix. This mitochondrial DNA is transcribed and translated inside the organelle separate from nuclear encoded genes that encode the majority of mitochondrial proteins. Another aim of my research is understanding how the transcription and translation of mitochondrial DNA is coordinated with these nuclear and cytosolic processes to generate functional enzymes. Nuclear-mitochondrial “communication” is important for maintaining cellular energy metabolism, and disruption of this can result in cellular malfunction and disease.

July 2014 – June 2019

Assistant Professor, Chemistry Department
Biochemistry & Molecular Biology Major Program Coordinator
Linfield College, McMinnville, OR

July 2013 – June 2014

Visiting Assistant Professor, Chemistry Department
Linfield College, McMinnville, OR

September 2009 – July 2013

Postdoctoral Fellow, Department of Pathology
Yale University School of Medicine, New Haven, CT
Advisor: Gerald Shadel, Ph.D.

Research assessing the utilization and regulation of mitochondrial DNA gene promoters by specific transcription factors in mammalian systems related to mitochondrial dysfunction, disease and aging.

July 2004 – August 2009

Research Assistant/PhD Candidate
University of Utah; Salt Lake City, UT
Advisor: Dennis Winge, Ph.D.

Thesis Title: "A Detailed Analysis of Cytochrome c Oxidase Assembly In Yeast Mitochondria"

August 2006 – December 2006

Biochemistry Teaching Assistant
University of Utah, Salt Lake City, UT
Course: Graduate Level Protein and Nucleic Acid Biochemistry (BLCHM 6410)

September 2002 – June 2004

Adjunct Chemistry Instructor
Portland Community College – Rock Creek Campus, Portland, OR
Courses: Fundamental and General Chemistry, Lecture and Laboratory (CH100 and CH104-106)

September 2002 – June 2004

Cardiology/Medical Genetics Research Assistant
Oregon Health and Sciences University, Portland, OR
Advisors: Petra M. Jakobs, Ph.D. & Mike Litt, Ph.D.

A genetic study to identify mutations in genes responsible for familial dilated cardiomyopathy and atrial fibrillation using purebred Irish Wolfhounds as a model system.

September 2001 – June 2002

Chemistry Department Teaching Assistant
University of Washington, Seattle, WA
Course: Undergraduate General Chemistry (CHEM 152 and 162)

March 2001 – September 2001

Volunteer Criminalistics Research Assistant
National Fish and Wildlife Forensics Lab, Ashland, OR
Advisor: Edgar O. Espinoza, Ph.D.

The forensic analysis of soil by a novel method using Raman spectroscopy; and the differentiation of bear and elk hemoglobin using mass spectrometry (MALDI-TOF analysis).

June 2000 – September 2000

Analytical Chemistry Summer Intern
Jeld-Wen Research & Development, Chiloquin, OR

A summer internship to develop a reference database of Fourier Transform Infrared (FT-IR) spectra from coatings and paints used on Jeld-Wen products for contamination analysis and weathering studies.

Peer-Reviewed Publications

- Nouws J, Goswami AV, **Bestwick M**, McCann BJ, Surovtseva YV, Shadel GS (2016). Mitochondrial Ribosomal Protein L12 Is Required for POLRMT Stability and Exists as Two Forms Generated by Alternative Proteolysis during Import. *Journal of Biological Chemistry* 291(2): 989-97.
- West AP, Khoury-Hanold W, Staron M, Tal MC, Pineda CM, Lang SM, **Bestwick M**, Duguay BA, Raimundo N, MacDuff DA, Kaech SM, Smiley JR, Means RE, Iwasaki A, Shadel GS (2015). Mitochondrial DNA stress primes the antiviral innate immune response. *Nature* 520(7548): 553-7.
- Bestwick ML** and Shadel GS (2013). Accessorizing the human mitochondrial transcription machinery. *Trends in Biochemical Sciences* 38(6): 283-91.
- Lodeiro MF, Uchida A, **Bestwick M**, Moustafa IM, Arnold JJ, Shadel GS, Cameron CE (2012). Transcription from the second heavy-strand promoter of human mtDNA is repressed by transcription factor A in vitro. *Proceedings of the National Academy of Sciences* 109(17): 6513-8.
- Malarkey CS, **Bestwick M**, Kuhlwilm JE, Shadel GS, Churchill ME (2012). Transcriptional activation by mitochondrial transcription factor A involves preferential distortion of promoter DNA. *Nucleic Acids Research* 40(2): 614-24.
- Liu L, Sanosaka M, Lei S, **Bestwick ML**, Frey JH Jr., Surovtseva YV, Shadel GS, Cooper MP (2011). LRP130 protein remodels mitochondria and stimulates fatty acid oxidation. *Journal of Biological Chemistry* 286(48): 41253-64.
- Shutt TE, **Bestwick M**, Shadel GS (2011). The core human mitochondrial transcription initiation complex: It only takes two to tango. *Transcription* 2(2): 55-59.
- Bestwick M**, Jeong M-Y, Khalimonchuk O, Kim H, Winge DR (2010). Analysis of Leigh Syndrome mutations in the yeast SURF1 homolog reveals a new member of the cytochrome oxidase assembly factor family. *Molecular and Cellular Biology* 30(18): 4480-91.
- Khalimonchuk O, **Bestwick M**, Meunier B, Watts TC, Winge DR (2010). Formation of the redox cofactor centers during Cox1 maturation in yeast cytochrome oxidase. *Molecular and Cellular Biology* 30(4): 1004-17.
- Bestwick M**, Khalimonchuk O, Pierrel F, Winge DR (2010). The role of Coa2 in hemylation of yeast Cox1 revealed by its genetic interaction with Cox10. *Molecular and Cellular Biology* 30(1): 172-85.
- Pierrel F, Khalimonchuk O, Cobine PA, **Bestwick M**, Winge DR (2008). Coa2 is an assembly factor for cytochrome *c* oxidase biogenesis that facilitates the maturation of Cox1. *Molecular and Cellular Biology* 28(16): 4927-39.
- Khalimonchuk O, Rigby K, **Bestwick M**, Pierrel F, Cobine PA, Winge DR (2008). Pet191 is a cytochrome *c* oxidase assembly factor in *Saccharomyces cerevisiae*. *Eukaryotic Cell* 7(8): 1427-31.
- Pierrel F, **Bestwick ML**, Cobine PA, Khalimonchuk O, Cricco, JA, Winge DR (2007). Coa1 links the Mss51 post-translational function to Cox1 cofactor insertion in cytochrome *c* oxidase assembly. *EMBO Journal* 26(20): 4335-4346.

Cobine PA, Pierrel F, **Bestwick ML**, Winge DR (2006). Mitochondrial matrix copper complex used in metallation of cytochrome oxidase and superoxide dismutase. *Journal of Biological Chemistry* 281(48): 36552-36559.

Litt M, **Bestwick ML**, Winther MJ, Jakobs PM (2005). Fifty-four new gene-based canine microsatellite markers. *Journal of Heredity* 96(7): 843-6.

Academic Grants, Fellowships & Awards

Heath, J.; Crosser, M.; **Bestwick, M.** (co-PI); Atkinson, E.; “MRI: Acquisition of an atomic force microscope for multidisciplinary research and undergraduate education.” Funded through the National Science Foundation (#1827971): 2018-2021, \$180,677.

Reinke, C.; **Bestwick, M.** (co-PI); Ray, S.; “Proposal Request for Molecular Genetic Organism Equipment.” Funded through E. L. Wiegand Foundation (#2454): 2018 – 2020, \$53,500.

Bestwick, M. (PI); “Regulation of mitochondrial DNA transcription by mitochondrial localized transcription factors.” Funded through Murdock College Research Program for Natural Sciences (#2015313): 2016 – 2019, \$58,500.

Bestwick, M. (PI); Kruchten, Anne (co-PI); “MRI: Acquisition of a liquid chromatography system to enhance interdisciplinary biochemistry research at Linfield College.” Funded through the National Science Foundation (#1532266): 2015-2018, \$83,177.

Linfield University Funded Grants

Student-Faculty Collaborative Research Grant; “Characterization of novel proteins affecting yeast lifespan in the presence of added copper”: 2022, \$ 12,014

Student-Faculty Collaborative Research Grant; “Determination of novel proteins affecting yeast lifespan in the presence of added copper”: 2021, \$ 13,067.

Faculty Development Grant; “Determination of novel proteins affecting yeast lifespan in the presence of added copper”: 2020, \$3603.

Student-Faculty Collaborative Research Grant; “Yeast copper proteins and reactive oxygen species in effecting lifespan”: 2019, \$14,648.

Student-Faculty Collaborative Research Grant; “The role of mitochondrial reactive oxygen species and copper proteins cytochrome *c* oxidase and superoxide dismutase 1 in yeast chronological lifespan”: 2018, \$9,331.

Student-Faculty Collaborative Research Grant; “The role of mitochondrial copper proteins and reactive oxygen species in yeast chronological lifespan”: 2017, \$9897.

Student-Faculty Collaborative Research Grant; “The role of mitochondrial copper in yeast lifespan and the production of reactive oxygen species”: 2016, \$6014.

Student-Faculty Collaborative Research Grant; “Quantification of mitochondrial RNA transcription products using ion-pair reverse phase liquid chromatography”: 2015, \$5762.

Previous Awards

Individual Postdoctoral NRSA Fellowship (NIH-NIDDK, F32DK091042); Yale University School of Medicine: 2011-2013

James Hudson Brown – Alexander B. Coxe Postdoctoral Fellowship; Yale University School of Medicine: 2010-2011

University of Utah Graduate Research Fellowship: 2008-2009

Hematology Department Predoctoral NRSA Institutional Training Grant (NIH-NIDDK, T32DK07115); University of Utah: 2006-2008

Chemical Biology Interface Predoctoral Institutional Training Grant (NIH, GM-08537); University of Utah: 2005-2006

Mindlin Brothers Graduate Student Fellowship; University of Washington: 2001 - 2002

Southern Oregon University Chemistry Department Scholarship: 1999-2000

Southern Oregon University Presidential Scholarship: 1997-2001

Poster Presentations & Abstracts

(Linfield undergraduate co-authors are underlined)

American Chemical Society (ACS) National Meetings Poster Presentations & Abstracts:

- (2022) Madeline Hedberg, M. Bestwick; “Mitochondrial DNA disease mutations effect on in vitro transcription”
- (2022) Hanna Shields, M. Bestwick; “Influence of Reactive Oxygen Species on Mitochondrial Transcription”
- (2022) James Weiser, M. Bestwick; “Is Retinoid X receptor alpha a mtDNA transcription factor?”
- (2021) Lottie Steward-Blanke, Natalie Wade, M. Bestwick; “Reactive oxygen species production and the influence of exogenous copper in yeast mitochondria;” *virtual presentation*
- (2020) Zachary McLeod, M. Bestwick; “Separation, Quantification, and Visualization of DNA”; *virtual presentation*
- (2019) Kelsey Bruce, M. Bestwick; “Fluorescent visualization of in vitro mitochondrial DNA transcription products”
- (2019) Zachary McLeod, M. Bestwick; “Separation and Quantification of Nucleic Acids by Ion-Pair Reversed-Phase High Performance Liquid Chromatography (IP RP HPLC)”
- (2019) Kelly Schultz, M. Bestwick; “Fluorescent Detection of Reactive Oxygen Species in *Saccharomyces cerevisiae* Applied to Chronological Lifespan”
- (2019) Zachary Sherlock, M. Bestwick; “Copper Modulation to Effect Yeast Lifespan”
- (2018) Shae Reece, M. Bestwick; “Identification of protein interactions for the mitochondrial transcription factor TFAM and mutants”
- (2018) Sarah Rempelos, M. Bestwick; “Determining the role of retinoid X receptor alpha in mitochondrial DNA transcription”
- (2018) Kelly Schultz, M. Bestwick; “Fluorescent detection of reactive oxygen species in *Saccharomyces cerevisiae* applied to chronological lifespan”
- (2018) Matthew Walser, M. Bestwick, “Quantifying the role of copper in modifying cytochrome c oxidase expression and oxidant production in yeast mitochondria”
- (2017) Amelia Keyes, M. Bestwick; “Tor1 and Yeast Longevity via Chronological Lifespan Assay”
- (2017) Dylan Legrady, M. Bestwick; “In Vitro Analysis of the Thyroid Hormone Receptor in Mitochondrial Transcription”

- (2017) Matthew Walser, M. Bestwick; “Role of Copper and Tor Signaling in Reactive Oxygen Species Induced Cell Aging”
- (2017) Henry Wienkers, M. Bestwick; “Quantification of DNA products using ion-pair reverse phase liquid chromatography”
- (2016) Henry Wienkers, M. Bestwick; “Quantification of in vitro transcription RNA products using ion-pair reverse phase liquid chromatography”
- (2015) Henry Wienkers, M. Bestwick; “Ion-pair reverse-phase liquid chromatography analysis for separating and quantifying RNA generated via in vitro transcription reactions”

American Society of Biochemistry and Molecular Biology (ASBMB) Annual Meeting Poster Presentations & Abstract:

- (2021) Lottie Steward-Blanke, Natalie Wade, M. Bestwick; “Reactive oxygen species production and the influence of exogenous copper in yeast mitochondria;” *virtual presentation*
- (2020) Zachary Sherlock, Sofia Bauer, M. Bestwick; “Copper Modulation and Reactive Oxygen Species Production Across Yeast Lifespan;” *abstract accepted, meeting canceled due to COVID*
- (2020) Lottie Steward-Blanke, M. Bestwick; “Detecting reactive oxygen species in yeast at early growth points;” *abstract accepted, meeting canceled due to COVID*
- (2020) Hannah Waterman, Dwight Keogh, M. Bestwick; “Identifying interactions of a mitochondrial localized ligand activated nuclear receptor and mtDNA interacting proteins;” *abstract accepted, meeting canceled due to COVID*

American Physical Society March Meeting Poster Presentation & Abstract:

- (2018) Agatha Ulibarri, M. Bestwick, Michael Crosser; “Measuring mitochondrial transcription factor A using graphene transistors”

Murdock College Science Research Conferences Poster Presentations:

- (2021) Madeline Hedberg, M. Bestwick; “Mitochondrial DNA disease mutations effect on in vitro transcription”
- (2021) Hanna Shields, M. Bestwick; “Influence of Reactive Oxygen Species on Mitochondrial Transcription”
- (2019) Lottie Steward-Blanke, M. Bestwick; “Detecting reactive oxygen species in yeast at early growth points”
- (2019) Zachary McLeod, M. Bestwick; “Separation, Quantification, and Visualization of DNA”
- (2018) Zachary Sherlock, M. Bestwick; “Copper Modulation to Effect Yeast Lifespan”**
** *this poster was awarded a Murdock Poster Prize in the field of Biochemistry*
- (2018) Kelsey Bruce, M. Bestwick; “A Method for Fluorescent Visualization of In Vitro Transcription Products”
- (2018) Kelly Schultz, M. Bestwick; “Fluorescent Detection of Reactive Oxygen Species in *Saccharomyces cerevisiae* Applied to Chronological Lifespan”
- (2018) Zachary McLeod, M. Bestwick; “Separation of Nucleic Acids by Ion Pair Reversed Phase High Performance Liquid Chromatography”
- (2017) Shae Reece, M. Bestwick; “Identification of protein interactions for the mitochondrial transcription factor TFAM and mutants”
- (2017) Sarah Rempelos, M. Bestwick; “Determining the role of retinoid X receptor alpha in mitochondrial DNA transcription”

- (2017) Kelly Schultz, M. Bestwick; “Fluorescent detection of reactive oxygen species in *Saccharomyces cerevisiae* applied to chronological lifespan”
- (2016) Amelia Keyes, M. Bestwick; “Tor1 and Yeast Longevity via Chronological Lifespan Assay”
- (2016) Dylan Legrady, M. Bestwick; “In Vitro Analysis of the Thyroid Hormone Receptor in Mitochondrial Transcription”
- (2016) Matthew Walser, M. Bestwick; “Role of Copper and Tor Signaling in Reactive Oxygen Species Induced Cell Aging”
- (2016) Henry Wienkers, M. Bestwick; “Quantification of In Vitro Transcription RNA Products Using Ion-Pair Reverse Phase Liquid Chromatography”
- (2015) Henry Wienkers, M. Bestwick; “Developing an analytical method for separating and quantifying RNA generated in in vitro transcription reactions.”
- (2014) Henry Wienkers, M. Bestwick; “Developing an analytical method for separating and quantifying RNA”

Northwest Regional Meeting (NORM) of the American Chemical Society Conference

- (2019) Kelsey Bruce, M. Bestwick; “Fluorescent visualization of in vitro mitochondrial DNA transcription products”

Oregon Academy of Science Annual Meetings Poster Presentations & Abstracts:

- (2019) Zachary McLeod, M. Bestwick; “Separation and Quantification of Nucleic Acids by Ion-Pair Reversed-Phase High Performance Liquid Chromatography (IP RP HPLC)”
- (2019) Kelly Schultz, M. Bestwick; “Fluorescent Detection of Reactive Oxygen Species in *Saccharomyces cerevisiae* Applied to Chronological Lifespan”
- (2019) Zachary Sherlock, M. Bestwick; “Copper Modulation to Effect Yeast Lifespan”
- (2018) Shae Reece, M. Bestwick; “Identification of protein interactions for the mitochondrial transcription factor TFAM and mutants”
- (2018) Kelly Schultz, M. Bestwick; “Fluorescent detection of reactive oxygen species in *Saccharomyces cerevisiae* applied to chronological lifespan”
- (2017) Kelsey Bruce, M. Bestwick; “In Vitro Analysis of the Thyroid Hormone Receptor in Mitochondrial Transcription”
- (2017) Amelia Keyes, M. Bestwick; “Tor1 and Yeast Longevity via Chronological Lifespan Assay”
- (2017) Matthew Walser, M. Bestwick; “Role of Copper and Tor Signaling in Reactive Oxygen Species Induced Cell Aging”

Previous Poster Presentations & Abstracts

- M. L. Bestwick**, G. S. Shadel (2011). Differential Regulation of Human mtDNA promoters by h-mtTFA/TFAM. *FASEB Summer Research Conference, Mitochondrial Assembly and Dynamics in Health, Disease and Aging.*
- M. L. Bestwick**, F. Pierrel, P. A. Cobine, O. Khalimonchuk, D. R. Winge (2007). Cytochrome c Oxidase Assembly Factor Coal Links the Mss51 Post-Translational Function to Cox1 Cofactor Insertion. *FASEB Summer Research Conference, Assembly of the Mitochondrial Respiratory Chain.*
- M. L. Bestwick**, F. Pierrel, P. A. Cobine, D. R. Winge (2006). A novel mitochondrial protein involved in the regulation of copper homeostasis. *FASEB Summer Research Conference, Trace Element Micronutrients.*

- P. M. Jakobs, **M. Bestwick**, S. M. Bousman, R. E. Hershberger, M. Litt (2004). Genetic linkage analysis of atrial fibrillation and dilated cardiomyopathy in Irish Wolfhounds. *Human Genome Meeting*; Berlin, Germany (Poster 286).
- D. Li, P. Jakobs, S.B. Parks, **M. Bestwick**, J. Kushner, E. Burket, S. Ludwigen, M. Litt, R. Hershberger (2003). Mutation of Muscle LIM Protein is an Uncommon Genetic Cause of Familial Dilated Cardiomyopathy. *American Human Genetics Society Meeting* (Poster 2256).

Oral Presentations

(Linfield undergraduate presenters are underlined)

Murdock College Science Research Conference, **2020**; Lottie Steward-Blanke, M. Bestwick.

Presentation title: “Multiple Methods for Fluorescent Detection of Reactive Oxygen Species in Yeast;” *virtual presentation*.

Linfield University Student Symposium, **2020**; Lottie Steward-Blanke, M. Bestwick. Presentation title: “Detecting reactive oxygen species in yeast at early growth points;” *virtual presentation*.

Linfield College Student Symposium, **2018**; Matthew Walser, M. Bestwick. Presentation title: “Copper, ROS, and Mitochondrial Stress: Understanding the pathways that govern metabolic homeostasis.”

Oregon Academy of Science Meeting, **2018**; Matthew Walser, M. Bestwick. Presentation title: “Copper, ROS, and Mitochondrial Stress: Understanding the pathways that govern metabolic homeostasis.”

Murdock College Science Research Conference, **2017**; Matthew Walser, M. Bestwick.

Presentation title: “Quantifying the role of copper in modifying cytochrome c oxidase expression and oxidant production in yeast mitochondria.”

Linfield College Taylor Series, *Spring semester 2017*. Presentation title: “Understanding the Basic Science of Mitochondria.”

Linfield College Science Colloquium, *Fall semester 2015*. Presentation title: “Regulation of Mitochondrial Transcription.”

Previous Presentations

Invited student speaker; University of Utah Chemical Biology Interface Training Grant Annual Retreat, 2008. Presentation title: “The Many Factors Required for the Assembly of Cytochrome *c* Oxidase.”

Invited student speaker; University of Utah Biological Chemistry/Molecular Biology Annual Student Retreat, 2007. Presentation title: “The Chaperoned Assembly of Cytochrome *c* Oxidase, Characterization of Coal.”

M. L. Bestwick, E.O. Espinoza (2001). The Forensic Analysis of Soil by Raman Spectroscopy. *2001 Northwest Association of Forensic Scientists - Fall Meeting*; presenter.

Linfield Undergraduate Research Students

Emma Sammartino (senior, biochemistry and molecular biology major); Yeast screen for proteins responding to copper modulation during chronological lifespan assay.

James Weiser (senior, biochemistry and molecular biology major); Characterizing the retinoid X receptor alpha and mitochondrial DNA interaction.

Madeline Hedberg ('22, biochemistry and molecular biology major); Assessing mitochondrial DNA mutations linked to bipolar disorder and Alzheimer's disease and their potential role is altering transcription.

Hanna Shields ('22, biochemistry and molecular biology major); Mitochondrial transcriptional changes in response to reactive oxygen species.

Zachary Sherlock ('21, biochemistry and molecular biology major); Role of copper and TOR signaling in reactive oxygen species (ROS) induced cell aging.

Lottie Steward-Blanke ('21, biochemistry and molecular biology major); Detection of reactive oxygen species in yeast using multiple fluorescent staining methods including microscopy and FACS.

Natalie Wade ('21, biochemistry and molecular biology major); Assessing the impact of copper in modifying cytochrome c oxidase expression in yeast mitochondria.

Hannah Waterman ('21, biochemistry and molecular biology major); Determining the role of peroxisome proliferator-activated receptor gamma in mitochondrial DNA transcription.

Sean Webster ('21, biochemistry and molecular biology major); Detection of reactive oxygen species in yeast by fluorescent microscopy.

Shannon Apgar ('20, biochemistry and molecular biology major); Influence of metals on yeast chronological lifespan in the $\Delta tor1$, $\Delta sch9$, and $\Delta tor2$ strains.

Sofia Bauer ('20, biochemistry and molecular biology major); Detection of reactive oxygen species in *Saccharomyces cerevisiae* by fluorescent microscopy.

Dwight Keogh ('20, biochemistry and molecular biology major); Identification of mitochondrial DNA binding proteins utilizing immunoprecipitation methods.

Zach McLeod ('20, chemistry major); Separation of DNA and RNA by Ion Pair Reversed Phase High Performance Liquid Chromatography.

Griffin Popp ('20, biochemistry and molecular biology major); Cellular localization of fluorescent-tagged ligand-activated receptors.

Kelsey Bruce ('19, biochemistry and molecular biology major); Analysis of mitochondrial in vitro transcription RNA products.

Kelly Schultz ('19, biochemistry and molecular biology major); Fluorescent detection of reactive oxygen species in *Saccharomyces cerevisiae* applied to chronological lifespan.

Sydney Wilcox ('19, biochemistry and molecular biology major); Incorporation of click-labeled UTP into newly synthesized yeast RNA for click-chemistry purification.

Shae Reece ('18, biochemistry and molecular biology major); Identification of protein interacting partners with the mitochondrial transcription factor TFAM using yeast two-hybrid system.

Sarah Rempelos ('18, biochemistry and molecular biology major); Determining the role of retinoid X receptor alpha in mitochondrial DNA transcription.

Matthew Walser ('18, biochemistry and molecular biology major); Quantifying the role of copper in modifying cytochrome c oxidase expression and oxidant production in yeast mitochondria.

Dylan Legrady ('17, biology major); In vitro analysis of the thyroid hormone receptor in mitochondrial transcription.

Alex Keyes ('17, chemistry major); Role of Tor1p in yeast longevity assayed by chronological lifespan.

Lauren Bishop ('17, biochemistry and molecular biology major); Chronological aging characterization in yeast cells with *SOD1* or *TOR1* gene deletions.

Ana Martinez Aguilar ('17, biochemistry and molecular biology major); The effect of mitochondrial electron transport chain inhibitors on superoxide production in yeast cells.

Henry Wienkers ('17, biochemistry and molecular biology major); Developing and analytical method for separating and quantifying DNA and RNA by ion-paired reverse phase liquid chromatography.

Robert Beezer ('16, biochemistry and molecular biology major); Role of Tor1p in yeast longevity assayed by chronological lifespan.

Adam Hernandez ('16, biochemistry and molecular biology major); Determination of yeast superoxide dismutase 1 (Sod1p) activity.

Lauren DeVore ('16, biochemistry and molecular biology major); The effect of rapamycin on mitochondrial electron transport chain activity and superoxide production.

Professional Service

Reviewer

National Science Foundation (NSF) Reviewer; 2022

Science, Mathematics, and Research for Transformation (SMART) Scholarship Panelist Reviewer, Department of Defense; 2021 – current

Life, *International Journal of Molecular Sciences* (MDPI) journal reviewer; 2020 – current
iScience reviewer; 2019 – current

PLoS One journal reviewer; 2010 – 2013

Professional Membership & Societies

Member, Oregon Academy of Science (OAS); 2017 – current

Member, American Chemical Society (ACS); 2014 – current

Member, American Society for Biochemistry and Molecular Biology (ASBMB); 2013 – current

Member, National Postdoctoral Association; 2009 – 2013

Member, American Assoc. for the Advancement of Science (AAAS); 2004 – 2009

Leadership in Service at Linfield University

General Education Review Committee (GERC); *Spring 2020 – current*
Co-Chair; *Spring 2021 – current*

Institutional Advising Council; *Spring 2022 – current*

Murdock Charitable Trust Faculty Liaison; *Fall 2017 – Fall 2022*

Professional Development & Training

NSF ADVANCE ASCEND Fellow; 2020 – current

Northwest Region – Chemistry Alliance

Women in STEM Leadership Program; April – May 2022 (virtual)

Alan Alda Center for Communicating Science, Stony Brook University

American Society of Biochemistry & Molecular Biology (ASBMB) Workshops:

Women’s History Month STEM Wikipedia Edit-a-thon; *March 16, 2022 (virtual)*

Teaching Science with Big Data; *June 20-25, 2021 (virtual)*

Supporting mental health and well-being of STEM students: Highlights from the National Academies’ Report; *April 7, 2021 (virtual)*

Best practices in online teaching in STEM; *July 10, 2020 (virtual)*

Steps Toward Equity in STEM; *June 2, 2020 (virtual)*

The Council of Independent Colleges (CIC) Seminar on Science Pedagogy; July 15-19, 2019

(Oakland, CA); continued participation in STEM programing and assessment at Linfield, *July 2019 – July 2021.*

POGIL (Process Oriented Guided Inquiry Learning) Workshops

Northwest Regional 3-Day Workshop; *June 30 – July 2, 2014*

POGIL one-day Learning Workshop; *Sept. 14, 2013*