

Rebecca M. Varney

Postdoctoral researcher

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EDUCATION

- Ph.D. Biology** 2017-2021
University of Alabama, Tuscaloosa, Alabama
Dissertation: Biomineralization in the radula of the chiton *Acanthopleura granulata*
Committee Members: Kevin Kocot, Matthew Jenny, Michael McKain, Laura Reed, Daniel Speiser
- M.S. Biology** 2013-2016
University of West Florida, Pensacola, Florida
Thesis Title: Telomere elongation in regenerating tissues of the Grey Sea Star *Luidia clathrata*
Committee Members: Christopher Pomory, Alexis Janosik, Hui Min Chung
- B.S. Genetics** 2007-2011
University of California at Davis, California

PUBLICATIONS

(379 citations)

- X. **Varney RM**, Speiser DI, Cannon JT, Aguilar MA, Eernisse DJ, Oakley TH. Mutually exclusive constraints dictate path dependence during rapid convergent evolution of chiton eyes. (in prep)
- X. **Varney RM**, Kingston ACN, Kocot KM, Speiser DI. Chitons modulate pH and withstand oxidative stress to biomineralize iron-clad teeth (in prep)
11. Zehnpfenning JR, **Varney RM**, Halanych KM, Mahon AR. (2022) Mitochondrial genomes provide insight into interfamilial relationships within Pycnogonida. *Polar Biology*
doi: 10.1007/s00300-022-03085-6
10. **Varney RM**, Yap-Chiongco MK, Mikkelsen NT, Kocot KM. (2022) Genome of the lepidopleurid chiton *Hanleya hanleyi* (Mollusca, Polyplacophora). [version 1; peer review: 1 approved]. *F1000Research* 2022, 11:555 (<https://doi.org/10.12688/f1000research.121706.1>)
9. Drábková1 M, Zrzavý J, Halanych KM, Oakley TH, Moroz LL, Cannon JT, Kuris A, Garcia-Vedrenne AE, Pankey MS, Ellis EA, **Varney RM**, Štefka1 J, and Kocot KM. (2022) Different phylogenomic methods support monophyly of enigmatic ‘mesozoans’ Dicyemida and Orthonectida (Lophotrochozoa) *Proc. R. Soc. B*. 289:20220683.20220683 <http://doi.org/10.1098/rspb.2022.0683>
8. Nehmens MC, **Varney RM**, Janosik AM, Ebert DA (2021) Telomere length and longevity: an exploratory study using a deep-sea shark, *Etmopterus granulosus*. *Frontiers in Marine Biology* 8,267. doi: 10.3389/fmars.2021.642872
7. **Varney RM**, McDougall C, Degnan BM, Speiser DI, Kocot KM. (2021) The iron-responsive genome of the chiton *Acanthopleura granulata*. *Genome Biology and Evolution*. 10.1093/gbe/evaa263
6. **Varney RM**, Schroedl M, Brenzinger B, Meyer C, Malaquias MA, and Kocot KM (2021) Assessment of mitochondrial genomes for heterobranch gastropod phylogenetics. *BMC Evolutionary Biology*. doi: 10.21203/rs.3.rs-30542/v1
5. Kocot KM, Wollesen T, **Varney RM**, Schwartz ML, Steiner G, Wanninger, A (2019) Complete mitochondrial genomes of scaphopod molluscs. *Mitochondrial DNA Part B*, 4:2, 3161-3162
doi 10.1080/23802359.2019.1666689

4. **Varney RM**, Funch P, Kocot KM, and Sørensen, MV (2019) A new species of Echinoderes (Cyclorhagida: Echinoderidae) from the San Juan Islands, Washington State, USA, and insights into the kinorhynch transcriptome. *Zoologischer Anzeiger Special Issue* 282:52-63 doi: 10.1016/j.jcz.2019.06.003
3. **Varney RM**, Pomory CM, and Janosik, AM (2017) Telomere elongation and telomerase expression in regenerating arms of the starfish *Luidia clathrata* (Asteroidea: Echinodermata). *Marine Biology*. 164:195 doi: 10.1007/s00227-017-3230-x
2. DeAngelis KM, Pold G, Topcuglu B, van Diepen L, **Varney RM**, Blanchard J, Melillo F and Frey S (2015) Long-term forest soil warming alters microbial communities in temperate forest soils. *Frontiers in Microbiology*. 6:104 doi: 10.3389/fmicb.2015.00104
1. DeAngelis KM, Sharma D, **Varney R**, Simmons B, Isern NG, Markillie LM, Nicora C, Norbeck AD, Taylor RC, Aldrich JT and Robinson EW (2013) Evidence supporting dissimilatory and assimilatory lignin degradation in *Enterobacter lignolyticus* SCF1. *Frontiers in Microbiology*. doi: 10.3389/fmicb.2013.00280

ARTICLES (NON-PEER REVIEWED)

2. **Varney RM**, Heinrich KK. (2021) A Garden, Not a Leaky Pipeline. *The Teaching Professor*.
1. **Varney RM** “The Wonders of Mud at FHL” (2019) Friday Harbor Laboratories Tide Bite.
<http://depts.washington.edu/fhl/tidebites/Vol73/index.html>

PRESS

1. Scientist finds professor who supported her love for bugs when she was 4. By Dawn Fallik, *Washington Post*. May 21, 2022 <https://www.washingtonpost.com/science/2022/05/21/bugs-rebecca-varney-vernard-lewis/>

GRANTS AND FELLOWSHIPS

UCSB Individualized Professional Skills (IPS) Grant Program Grant in support of field research, 2022	~\$1,000
“Tiny brains, big ideas: convergent evolution of complex processing centers across arthropods” Split-Seq Single-cell Sequencing Core Lab Grant, 2021	~\$15,000
Research Experience for Post-Baccalaureate Students (REPS), 2021 In collaboration with Todd Oakley, supports one post-bac student on salary for a full year of research as an extension to an existing NSF grant	\$48,675
Marine Biological Laboratories Support Grant, 2020 Course Fellowship, Embryology	\$6,500
University of Alabama Graduate Council Fellowship, 2020-2021 Research Fellowship	\$44,497
American Genetics Association Grant for Invited Symposium Speakers World Congress of Malacology Genomics Session, 2019	\$500
American Genetics Association Student Travel Grant, 2018 Flights and lodging for GIGAiii	\$2000
University of Alabama Student Travel Grant, 2018 Field work in Curacao	\$500
Lerner-Gray Memorial Fund, 2018 Field work in the Florida Keys	\$2217
Conchologists of America, 2018 Field work in the Florida Keys	\$2218
E.O. Wilson Biodiversity Fellowship, Summer 2018 Dissertation field work in the Florida Keys	\$5000

Western Society of Malacologists Research Grant, 2018 Differential gene expression analysis in the iron-mineralized radulae of four species of chitons from the Pacific Northwest	\$1000
University of Alabama Graduate Council Fellowship, 2018-2019 Research Fellowship	\$44,497
Charlotte Magnum Travel Award, Fall 2017 SICB 2018 Housing	\$1500
University of Alabama Travel Grant, Fall 2017 Travel to SICB 2018	\$1000
E.O. Wilson Biodiversity Fellowship, Summer 2017 Dissertation field work in Washington State, Friday Harbor Marine Labs	\$5000
Alan J. Kohn Endowed Fellowship at UW Friday Harbor Laboratories, Summer 2017 Marine Invertebrate Zoology	\$2000
UWF Scholarly and Creative Activities Committee Research Grant Class B, Fall 2015 Post-regeneration telomere elongation in <i>Luidia clathrata</i>	\$500
UWF Scholarly and Creative Activities Committee Travel Grant Class C, Spring 2015 Novel microsatellites for the Gulf of Mexico hagfish	\$500
UWF Scholarly and Creative Activities Committee Research Grant Class A, Fall 2014 Development of novel microsatellites for three Gulf of Mexico hagfishes	\$1000

OTHER AWARDS

- Arts and Sciences Outstanding Doctoral Dissertation Award, University of Alabama 2021
- Best Graduate Student Presentation, American Society of Microscopy, SICB 2020 **\$150**
- Ralph L. Chermock Prize to the most outstanding graduate student in systematics and ecology, 2020 **\$800**
- Outstanding Teaching by a Graduate Student Fall 2019
- Best Student Talk, World Congress of Malacology, 2019. **\$300**
- Joab Langston Thomas Scholarship for outstanding scholarship, creativity and potential as a scholar and teacher, 2019. **\$2500**
- Chair's Scholarship for Outstanding Contribution to Teaching in Biological Sciences, University of Alabama, 2017 **\$2500**
- Most Physiologically Accurate, Friday Harbor Laboratories Invertebrate Ball Costume Contest, 2017
- Outstanding Graduate TA, University of West Florida, 2015
- Best Graduate Presentation, Hal Marcus College of Science and Engineering Student Scholars Symposium, 2016 **\$250**
- 2nd Place Overall Graduate Presentation, University of West Florida Student Scholars Symposium, 2016 **\$500**

DIVERSITY, EQUITY, AND INCLUSION ACTIVITIES

Activities

- Mentor for Women Lead - UF Institute for Early Career Scholars, matches new graduate students with an external mentor to help them navigate graduate school. (<http://postdoc.aa.ufl.edu/programs/women-lead/>)

- Letters to a Pre-Scientist - Scientist pen-pal for students in schools from lower-income communities/schools with a low percentage of students continuing to college. 2017-2018, 2018-2019, 2019-2020, 2020-2021, 2021-2022

Workshops Organized

- Junior Faculty Launch Workshop - SICB 2022. This program is aimed at decreasing the phenomenon of insider knowledge in the academic job search. Co-organized by Deidre Lyons (UC San Diego), Billie Swalla (University of Washington), and Leslie Babonis (Cornell) I was invited to be the post-doctoral member of the panel, and will continue to participate in future years, ideally as I progress in career stage.

Workshops Attended

- Building a Better Fieldwork Future (BBFF) - offered through UC Santa Cruz, this workshop focuses on preventing and addressed harassment and assault in fieldwork settings. March 15, 2022.
- Implicit Bias Workshop - offered through UCLA for postdoctoral researchers. September 2021
- DEI-Sensitive Mentorship Workshop - offered by the Society of Developmental Biology, directed by Dr. Nancy Schwartz. July 2020.
- Strategies to Identify Bias in the Culture of Biology - offered by the Society of Developmental Biology, directed by Dr. Loydie Jerome-Majewska. July 2020.
- Racism, Microaggression, Social Injustice, and Minority Mental Health- seminar offered by Dr. Nahree Doh, hosted by the University of Alabama DEI Office. July 7, 2020.

Memberships

- Graduate Women in Science (GWIS), President (2013-2016) and co-founder
- Association of Women in Science

FORMATIVE COURSEWORK

Embryology - MBL Woods Hole	Summer 2022
A course driven by fearless curiosity and high unlimited resources.	
Invertebrate Zoology - Friday Harbor Laboratories	Summer 2017
A (sometimes literally) immersive course taking full advantage of the biodiversity of the San Juan Islands to embrace invertebrate diversity.	
Integrated Genomics - UA	Spring 2017
A CURE (Course-based Undergraduate Research Experience), run by the now-head of the NSF Genomics Education Partnership. I facilitated class activities and assisted undergraduates in genome annotation.	

INVITED TALKS AND SEMINARS

Upcoming: University of Wisconsin, Madison, Evolution Seminar.	Fall 2022
Extreme environments, inside and out: how animals evolve to live with toxins.	
Keynote Address - NSF Genomics Education Partnership Regional Node Meeting	April 22, 2022
To crack a chiton: new challenges for gene annotation in non-model organisms	
University of Florida, Biology Seminar Series.	November 30, 2021
Iron teeth and dried out shrimp: how invertebrates are stressed for success	
California State University, Fullerton, Biology Seminar Series.	November 3, 2021
Iron biomineralization in the chiton radula	
Mem. Univ. of Newfoundland, Friday Light Informal Research Talk (FLIRT) series.	September 11, 2020
Iron-clad teeth in chitons: how to avoid cavities without really trying	
SpiraliaBase Virtual Lab Meeting Series	September 10, 2020

High Molecular Weight DNA Extraction Techniques in Spiralian
World Congress of Malacology, Utility of Molluscan Genomics Session
An Aculiferan perspective on molluscan mineralization
Best Student Talk

August 2019

ORAL PRESENTATIONS

- Society of Integrative and Comparative Biology January 4, 2022
The role of iron-response elements (IREs) in regulating translation during iron biomineralization in the chiton radula
Rebecca M. Varney, Alexandra C.N. Kingston, Kevin M. Kocot, Daniel I. Speiser
- Society of Integrative and Comparative Biology January 7, 2021
Chitons on the cutting edge: the biomineralization of iron-clad teeth in *A. granulata*
Rebecca Varney, Daniel I. Speiser, Alexandra C.N. Kingston, Kevin M. Kocot
- Society of Integrative and Comparative Biology January 5, 2020
The genome of the chiton *A. granulata*: an Aculiferan perspective on molluscan mineralization
Rebecca M. Varney, Caramel McDougall, Bernie Degnan, Daniel I. Speiser, Kevin M. Kocot
- 5th Annual Scalidophoran Conference January 23, 2019
A new species of Echinoderidae and first insights from the kinorhynch transcriptome
Rebecca Varney, Peter Funch, Kevin Kocot, Martin Vinter Sørensen
- UWF Biology Seminar Series October 15, 2016
Telomere elongation in regeneration tissues of *Luidia clathrata*
Rebecca Varney, Alexis Janosik, Christopher Pomory

RESEARCH EXPEDITIONS

- Antarctic Research Cruise** September 20-December 18, 2020
RVIB Nathaniel B. Palmer
Weddell Sea and Peninsula, sampling for benthic invertebrates
- LA Urban Ocean BioBlitz** August 19-August 31, 2019
BioBlitz under Dr. Gustav Pauley alongside the LA Museum of Natural History, day trips aboard the Ocean Sentinel
Sediment grabs and sorting
- DISL Meiofauna Diversity and Taxonomy Workshop** August 4-August 10, 2019
Meiofaunal collection and sorting in collaboration with Dr. Kelly Dorgan's laboratory at the Dauphin Island Sea Lab, day trips aboard the R/V E.O. Wilson
Sediment collection and sorting
- Meiofaunal Sampling, Ft. Pierce** May 11-15, 2018
Day trips aboard the R/V Sunburst
Sediment grabs and sorting
- South Carolina Department of Natural Resources** September 2-September 5, 2014
Coastal Shark and Red Drum Population Surveys, R/V Silver Crescent
Longlining along Atlantic Coast
- Deep-C Consortia Research Cruise** June 30-July 4, 2014
Florida State University, R/V Apalachee
Deep sea longlining in the Gulf of Mexico
- Gulf of Mexico Reef Monitoring** September 2013
Deep sea line fishing for triggerfish and red snapper

TEACHING EXPERIENCE

Upcoming: FHL Marine Invertebrate Zoology Co-instructor with Dr. Megan Schwartz Friday Harbor Laboratories, University of Washington	Summer 2023
Guest Lecture: Macroevolution and Tree Thinking Introduction to Evolution at University of California Santa Barbara (Dr. Eleanor Cave's invitation)	March 2, 2022
Guest Lecture & Guided Lab: Meiofaunal Invertebrates Marine Invertebrate Zoology Field Course at the University of Florida (Dr. Gustav Paulay's invitation)	February 12, 2020
Guest Lecture: The Immune System Principles of Biology, II	October 24, 2019
Invited Lecture: Introduction to the Shell Bioinformatics	August 23, 2018
Invited Lecture: Sequencing Phage Genomes with 3rd Generation Technology Phage Discovery	April 11, 2018
Graduate Teaching Assistant Microbes and Man	Spring 2017 - Spring 2020
Instructor of Record Biology I Laboratory *Instructor of Record indicates that instructional context of the course was formatted and grades were assigned by that individual	Spring 2015 - Fall 2016
Coursework Development Collaborative development of laboratory curriculum and student lab manual for Biology I Laboratory	Spring 2015 - Fall 2016
Graduate Teaching Assistant Marine Vertebrate Zoology Introduction of Marine Biology and Oceanography for Non-Majors Biology I Laboratory	Fall 2014

***Very positive teaching evaluations and comments from students and faculty observers available upon request.**

MENTORSHIP

Singular supervision

UC Santa Barbara Fall 2021 - Summer 2022	Direct supervisor of NSF REPS Scholar post baccalaureate Cheyenne McKinley*, who was awarded a GRFP Fall 2022
UC Santa Barbara Fall 2021 - Present	Direct supervisor of undergraduate Victoria Scriven*, who is completing an independent research project that will result in a publication before she continues to medical school.

Graduate Student Training and Supervision

University of West Florida Spring 2014 - Fall 2015	Supervised three graduate student directed independent studies (B. McAcy, E. Stein, A. Earls) and trained four additional graduate students in genetic techniques (S. Cecil, M. Davis, C. Nash, A. Egan)
Univ. of Massachusetts	Trained three graduate students in anaerobic culturing techniques (A.

Fall 2011 - Spring 2013 Billings, F. Abdul-Rahman, D. Sharma)

Undergraduate Student Training and Supervision

University of Alabama Assisted with laboratory and bioinformatics training for **three**
Fall 2018 - Spring 2021 undergraduates (E. Pabst*, R. Partain, C. Pruett)

University of West Florida Trained and supervised the directed independent studies of **thirteen** under-
Fall 2013 - Spring 2016 graduate research assistants in basic laboratory skills and genetic techniques
(K. Vaccaro*, A. Johanssen, H. Sthole*, H. Schmuki*, L. Hartigan, A. Nes-
smith, R. Rogers, C. Howard, E. Miller, N. Zielinski*, I. Bollinger*, A.
Brooks*, K. Price)

Univ. of Massachusetts Trained **three** undergraduate research assistants in microbiology laboratory
Fall 2011 - Spring 2013 techniques (D. Burkhardt*, B. Surjawan*, G. Gundersen)
* denotes an undergraduate or post baccalaureate student that went on to
pursue a graduate or medical degree

SERVICE

Reviewer: Ecology & Evolution, Zoological Journal of the Linnean Society, Nature Communications,
Zoologica Scripta, Scientific Reports, Communications Biology, Current Biology, and others.

Graduate/Postdoc Representative, Division of Invertebrate Zoology, SICB 2020-2022

Undergraduate Research Symposium Planner/Judge April 22, 2022

Graduate Teaching Assistant Workload Assessment Committee Academic year 2018-2019

Biology Graduate Student Association (BGSA) President Academic year 2018-2019

Bama Biology Bootcamp, Graduate mentor Fall 2018

Bama Biology Bootcamp Mentor Training Workshop August 11, 2018
(developed content and taught workshop)

Bama Biology Bootcamp Organization and Schedule Planning Summer 2018

Undergraduate Research and Creative Activities (URCA) Judge March, 2019/2018; March 29, 2018

Bama Biology Bootcamp, Graduate mentor Fall 2017

University of West Florida Biology Department Advertising Committee Spring 2015-Fall 2016

OUTREACH

ArBOOretum Volunteer: arboretum tours, organization. October 27, 2019

UA Homecoming Biology Collections Outreach Tent October 26/13, 2019/2018

Bessemer Country Science Fair: Volunteer judge. January 16, 2019

BioBlitz Volunteer (herbarium specimen preparation & arboretum tours) April 21, 2018

Skype A Scientist Scientific volunteer 2017-2020

Alabama Regional Science Olympiad Competition Judge February, 2018/2017

Volunteer, Night at the Museum February 2019, 2018, 2017

Northwest Florida Regional Science Olympiad Competition Judge February 2016, 2015

High school lecture- A Career in Biology November 20, 2015

58th Annual West Panhandle Regional Science and Engineering Fair Judge January 27, 2014

Panelist: Preparing for Graduate School January 15, 2014

POSTER PRESENTATIONS

Society of Integrative and Comparative Biology January 5, 2020
Localized physiological changes regulate the biomineralization of magnetite in the radula of the chiton
Acanthopleura granulata
RM Varney, ACN Kingston, KM Kocot, DI Speiser
***Best Student Presentation, AMS**

- Entomology October 2019
 Two new bumble bee genomes: *de novo* assembly of *Bombus bifarius* and *Bombus vosnesenskii* genomes from long and short read sequences
 S Heraghty, J Strange, J Sutton, **RM Varney**, J Lozier
 BioFest, University of Alabama September 27, 2019
 Radular physiology of the chiton *Acanthopleura granulata*
RM Varney, KM Kocot, DI Speiser
- Pearls of Wisdom Molluscan Genomics Conference September 2019
 A cost-effective strategy to obtain highly contiguous aculiferan mollusc genomes enables broader investigations of understudied molluscs
RM Varney, MK Yap-Chiongco, NT Mikkelsen, S Pirro, DI Speiser, KM Kocot
- World Congress of Malacology August 2019
 Draft genome of *Neomenia megatrapezata* (Solenogastres) as a tool to study aculiferan sclerite biomineralization
 MK Yap-Chiongco, **RM Varney**, KM Kocot
- Evolution July 2019
 Assessing the genomes of *Drosophila* species for genetic indicators of alpha-amanitin tolerance
 O Fish, C Scott-Chialvo, **RM Varney**, LM Reed
- Global Invertebrate Genomics Alliance October 20, 2018
 The genome of the chiton *Acanthopleura granulata*
RM Varney, DI Speiser, KM Kocot
- BioFest, University of Alabama September 28, 2018
 The genome of the chiton *Acanthopleura granulata*
RM Varney, DI Speiser, KM Kocot
- STEM Forward 2018: Shattering the STEM Ceiling April 14, 2018
 The genome of the chiton *Acanthopleura granulata*: preliminary work toward understanding biomineralization of teeth as tough as tank armor
RM Varney, DI Speiser, KM Kocot
- Society of Integrative and Comparative Biology January 5, 2018
 The genome of the chiton *Acanthopleura granulata*: preliminary work toward understanding biomineralization of teeth as tough as tank armor
RM Varney, DI Speiser, KM Kocot
- University of West Florida Student Scholars Symposium April 21 2016
 Telomere elongation in regenerating tissues of the Grey Sea Star, *Luidia Clathrata*
RM Varney, CM Pomory, AM Janosik
- 24th Annual Harvard Forest Ecology Symposium March 20 2013
 Microbial community dynamics in a long-term soil warming chronosequence
 KM DeAngelis, LV Diepen, **RM Varney**, JR Blanchard, JR Melillo, S Frey
- University of Massachusetts Microbiology Retreat March 2 2013
 Digging Deep: Soil microbial carbon use in a warmer world
 A Billings, **RM Varney**, G Pold, DR Burkhardt, B Surjawen, KM DeAngelis

OTHER RESEARCH EXPERIENCE

- Research Fellow** May 2012-August 2013
 University of Massachusetts at Amherst Advisor: Prof. Kristen DeAngelis
- Laboratory Technician** (Analytical Chemistry) December 2011-May 2012
 Microtest Laboratories, Inc. Supervisor: Patrick Kenney, M.S.
- Laboratory Assistant** August 2009-August 2011
 University of California at Davis Advisor: Prof. Dina St. Clair

Undergraduate Research Assistant
University of California at Davis

October 2007-June 2009
Advisor: Prof. Leslie Lyons

OTHER WORKSHOPS ATTENDED

- NSF Detecting Selection in Polar Organisms Workshop - prior to SICB, January 2018 and 2019.
- University of Alabama Research Software Initiative - Kickoff Workshop
September 28, 2018
- BITMaB2 (Benthic Invertebrate Taxonomy, Metagenomics, and Bioinformatics)
Harte Research Institute, Corpus Christi, Texas. January 16-19, 2018
- Genome Solver Workshop: Introducing molecular tools to undergraduates. NSF/Georgetown University, Anne Rosenwald. March 8-9, 2016
- Molecular Ecology and Genetics workshop prior to JMIH 2014, coordinated by Dovi Kacev
University of Tennessee, Chattanooga
- Introduction to Command Line(BASH) and Python (iPy notebook) by Software Carpentry, 2013.

OTHER PROFESSIONAL DEVELOPMENT

- Scientific Branding Workshop - led by Dr. Alexis Janosik. May 27, 2020.
- David Bauer Grant-Writing Workshop for Graduate Students - a nomination-based workshop led by David G. Bauer. August 25, 2018
- Women in Leadership - a conference at UWF addressing issues particular to women in leadership positions. February 13, 2015

PROFESSIONAL AFFILIATIONS

- Global Invertebrate Genomics Alliance (GIGA) from 2018
- Society of Integrated and Comparative Biology (SICB) (from 2015)
- Golden Key Honour Society (from 2011)
- AWIS (from 2013)
- ASIH (from 2013)
- Phi Beta Kappa Honour Society (from 2014)

CERTIFICATIONS

- SCUBA: Divemaster (2015), AAUS (current 2022)
- CPR (Emergency First Responder, First Aid, AED, O2 Administrator)
- WFA (Wilderness First Aid) and epinephrine auto-injector training (American Heart Association and Code 3 Life Support Education), 2022