CURRICULUM VITAE

Isaac R. Miller, Ph.D.
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Education and Training:

1. Montana State University, August 2017- December 2023, Ph.D.Dept. of Microbiology and Cell Biology
    - ◊ Advisor: Matthew Fields; Committee: Carl Yeoman, Robin Gerlach, Seth Walk and Roland Hatzenpichler
    - ◊ Dissertation title: Phycosomal Dynamics in Xenic Cultures of the Alkalitolerant Green Microalga Chlorella sp. SLA-04
2. Montana State University, August 2013-December 2015, B.S. Organismal Biology
    - ◊ Capstone thesis title: The native fish microbiome and its manipulation for use in aquaculture
3. Westminster College, Salt Lake City, UT; (August 2012-April 2013, Transferred)

Research Experience:

1. Postdoctoral Scientist, Bigelow Laboratory for Ocean Sciences, January 2024 – Present
2. Graduate Research Assistant, Department of Microbiology and Cell Biology, Montana State University, August 2017 – December 2023
3. Graduate Teaching Assistant, Department of Microbiology and Immunology, Montana State University, January 2019 - December 2019
4. Research Technician, Center for Biofilm Engineering, July 2016 – August 2017
5. Undergraduate Research Assistant, Center for Biofilm Engineering, March 2014 - January 2016
6. Undergraduate Research Assistant, Bozeman Fish Technology Center, May 2014 - January 2016

Teaching and Mentoring Experience:

1. Keller Bloom Program, Bigelow Laboratory for Ocean Sciences, May 2024, May 2025
2. Teaching Assistant, General Microbiology (BIOM360), Montana State University, January 2019 - December 2019
3. Undergraduate students mentored:
    - o Jackie Wallis, NSF REU Program. May 2025 – August 2025
    - o Vaun Natalroman, Sea Change Semester, August 2024 – December 2024
    - o Alejandro Mapula, NSF REU Program. May 2024 – Present
    - o Justus Smith, NSF REU Program. May 2023 - August 2023
    - o Nathan Bowman, NSF REU Program. May 2022 - August 2022
    - o Aly Welch, Dept. of Biological Engineering. August 2021 - May 2022

- Sierra Bedwell, Dept. of Microbiology and Cell Biology. August 2019 - May 2021; now a PhD Student at U. of Illinois-UC
- Willy Totten, Dept. of Chemical Engineering. March 2018 - December 2018
- Derrick Scott, Dept. of Civil Engineering. October 2016 - May 2017
- Caitlin Olson, Dept. of Chemical Engineering. October 2016 - May 2017

Fellowships and Awards:

1. Graduate Leadership Academy, Montana State University, August 2021 - May 2022
2. John Neuman Student Citizen Award, Center for Biofilm Engineering, January 2022
3. Molecular Bioscience Program, 5-year fellowship, Montana State University, August 2017-present
4. National Science Foundation Graduate Research Fellowship Program (NSF GRFP), September 2017 - August 2022

Outreach and Service:

1. Maine Science Festival
2. Child Advancement Project, mentor. November 2017 – December 2023
3. Letters to a Pre-Scientist, mentor. August 2019 – May 2023
4. Family Science Day, Montana State University, March 2022, February 2023
5. Ennis Public Schools Science Fair, judge. January 2022, 2023

Synergistic Activities:

1. ASLO Ecological Dissertations in Aquatic Sciences (Eco-DAS), April 2025
2. Manuscript reviewer: Frontiers in Microbiology, Algal Research, ICES Journal of Marine Sciences
3. Center for Biofilm Engineering Seminar Committee, 2021- 2023
4. NSF GRFP Writing Workshops, 2019 – 2022
5. Molecular Bioscience Program, Student President. May 2020 - May 2022
6. Consultant editor on book titled How to get rid of (and prevent) swimming pool algae, 2021. Written by Rudy Stankowitz, edited by Richard A Falk and Isaac Miller

Field Work Experiences:

1. Hot spring characterization and *in situ* mesocosm incubations, undergraduate mentoring, Yellowstone National Park, September 2021
2. Coalbed methane down well sampling. Birney, Montana, December 2016
3. Trout electroshocking and collection, metadata collection, Gallatin Gateway, Montana, June 2015
4. Pallid sturgeon netting, sampling and tagging, metadata collection, Roy, Montana, June 2014, 2015

Publications:

1. **Miller, I.R.,** Bui, H., Maddi, B., Viamajala, S., Gerlach, R., and Fields, M.W. Bacterial Community Dynamics During Successive Outdoor Microalga Cultivation from Late Summer to Fall. 2024. Aquaculture.
2. **Miller, I.R.,** Bui, H., Gerlach, R., and Fields, M.W. Understanding the Phycosome to Improve Industrial Microalgae Cultivation. 2024. Trends in Biotechnology.

3. Fuchs A.L., **Miller I.R.,** Schiller S.M., Ammons M.C.B., Eilers B., Tripet B., and Copié V. Pseudomonas aeruginosa Planktonic- and Biofilm-Conditioned Media Elicit Discrete Metabolic Responses in Human Macrophages. 2020. Cells.
4. Payne, D.*, Dunham, E.C.*, Mohr, E.*, **Miller, I.R.*,** Arnold, A.*, Erickson, R.*, Fones, E. M.*, Lindsay, M. R., Colman, D. R., and Boyd, E. S. Geologic legacy spanning >90 years explains unique Yellowstone hot spring geochemistry and biodiversity. 2019. Environmental Microbiology.
5. Maskill, P.A.C., **Miller, I.R.,** Halvorson, L.J., Treanor, H.B., Fraser, C.W., and Webb, M.A.H. The role of sex ratio and density on fertilization success of intensively cultured endangered woundfin 2017. Journal of Fisheries Research and Management.
6. Treanor, H.B., **Miller, I.R.,** Halvorson, L.J., Van Eenennaam, J.P., Doroshov, S.I., and Webb, M.A.H. Effect of dietary fat on adipocyte size in captive age-2 and age-3 white sturgeon Acipenser transmontanus. 2017. Journal of Applied Ichthyology.
7. **Miller, I.R.,** Kappenman, K.M., and Talbott, M.J. Upper lethal temperature of larval pallid sturgeon Scaphirhyncus albus (Forbes and Richardson, 1905). 2016. Journal of Applied Ichthyology.

Manuscripts in Preparation:

1. Smith, H.J., Zelaya, A., **Miller, I.R.,** Joyner, D., Hazen, T., Arkin, A.P., Adams, P., and Fields, M.W. Insights into the Role of Active Shallow Subsurface Microbial Assemblages in Groundwater and Sediment Habitats. In Preparation.
2. **Miller, I.R.,** Bui, H., Gerlach, R., and Fields, M.W. Diel Cycle Microalgal Metabolism Drives Shifts in Phycosome Activity in High pH-High Alkalinity Cultures. In Preparation.
3. **Miller, I.R.,** Bui, H., Gerlach, R., and Fields, M.W. Phycosomal Bio-Flocculation as a Xenic Culture Phenotype. In Preparation.
4. **Miller, I.R.,** Stamieszkin, K., Poulton, N.J., and Millette, N.C. Methods for quantifying prey ingestion in xenic cultures of mixotrophic protists. In Preparation.

Presentations:

1. **Miller I.R.,** Bui, H., Gerlach, R., and Fields, M.W. Algal Biomass Summit, Madison, WI, October 2023; Panel speaker.
2. Gerlach, R., Bui, H., **Miller I.R.,** Arnold. A., Vadlamani, A., Pendyala, B., Nowzaridalini, N., Carlson, R., Fields, M.W. and Viamajala, S. Algal Biomass, Biofuels and Bioproducts, Hawaii, June 2023. Platform speaker co-author
3. Fields, M.W., Thornton, I., Zimlich, K., **Miller, I.R.,** Bowman, N., Townsend, K., Smith, H.J., and Wilking, J. ASM Biofilms, North Carolina, November 2022; invited speaker co-author
4. **Miller I.R.,** Bui, H., Gerlach, R., and Fields, M.W. Algal Biomass Summit, Virtual, October 2022; Panel speaker.
5. **Miller I.R.,** Bui, H., Maddi, B., Viamajala, S., Gerlach, R., and Fields, M.W. 18th International Society on Microbial Ecology (ISME18), Lausanne, Switzerland, August 2022; Poster.
6. **Miller I.R.,** Bui, H., Bowman, N, Welch, A, Gerlach, R., and Fields, M.W. UiT The Arctic University of Norway, Tromso, Norway, August, 2022. Invited speaker.

7. Bui, H., **Miller, I.R.,** Nowzaridalini, N., Cicha, C., Wiedenheft, B., Viamajala, S., Fields., M.W., and Gerlach, R. Joint Genome Institute Annual Genomics of Energy and Environment Meeting, Virtual, August 2022; Panel speaker co-author
8. **Miller I.R.,** Bui, H., Gerlach, R., and Fields, M.W. Algal Biomass Summit, Virtual, October 2020. Panel speaker.
9. Smith H.J., Zelaya, A., **Miller, I.R.,** Joyner, D., Hazen, T., Arkin, A.P., Adams, P., and Fields, M.W. Department of Energy Genomic Sciences Meeting, Washington D.C., February 2018. Poster.
10. Smith H.J., Zelaya, A., **Miller, I.R.,** Joyner, D., Hazen, T., Fields, M.W., Arkin, A.P., Adams, P. Department of Energy Genomic Sciences Meeting, Washington D.C., Poster.
11. Montana Biofilm Meeting, Bozeman, MT, July 2017, 2018, 2019, 2021, 2022; Posters, various titles

Grants with Major Contributions:

1. NSF 2230102; Collaborative Research: Investigating the relationship between size and the balance between carbon acquisition modes in mixotrophic protists. Contributions: experimental design, data collection, undergraduate mentoring, milestone reports, manuscript preparation, conference presentations
2. NSF URoL 2125083, 2021-2026; Understanding the Rules of Life, MIM: Deciphering and Optimizing Cross-Domain Interactions to Increase Productivity in High pH-High Alkalinity Microalgae Communities; Drs. Robin Gerlach, Huyen Bui, Ross Carlson and Matthew Fields; Contributions: preliminary data, drafting proposal, producing reports, manuscript preparation, conference presentations
3. DOE DE-EE0009273, 2017-2022; High pH/High Alkalinity Cultivation for Direct Atmospheric Air Capture and Algae Bioproducts; Drs. Sridhar Viamajala, Robin Gerlach, Matthew Fields, Ross Carlson and Greg Characklis; Contributions: preliminary data, producing milestone reports, contributing to go/no-go presentations, manuscript preparation, conference presentations
4. DOE DE-EE0008247; 2016-2021; A comprehensive strategy for stable, high productivity cultivation of microalgae with controllable biomass composition; Drs. Sridhar Viamajala, Robin Gerlach, Matthew Fields, Blake Wiedenheft, Ross Carlson, Brent Peyton and Greg Characklis; Contributions: producing milestone reports, contributing to go/no-go presentations
5. Internal Montana State University, Cryo-EM Seed Grant Funding; 2021; Characterization of Algal-Bacterial Interactions using Cryo-CLEM
6. Internal Montana State University, Raman Seed Grant Funding; 2019; Disentangling the influence of metabolic exchange in algal microbiome on algal physiology