

Abdi-Rizak M. Warfa

UNIVERSITY OF MINNESOTA

Twin Cities Campus

*Biology Teaching + Learning
College of Biological Sciences*

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Education

Degree	Institution and Area or Department	Year
PhD.	University of Minnesota, Twin Cities, Science Education <i>Advisor: Gillian Roehrig, STEM Education Center</i>	2013
PhD. Candidacy	University of Washington Seattle, Chemical Biology	2006
MSc.	University of Washington Seattle, Chemical Biology	2005
BSc.	University of California San Diego, Chemistry & Biochemistry	2000

Current Positions

University of Minnesota Twin Cities, MN

Assistant Professor, Department of Biology Teaching + Learning 2016–Present

University of Minnesota Twin Cities, MN

Graduate Faculty Status, Department of Curriculum & Instruction 2016–Present

Previous Employment

Metropolitan State University, St Paul, MN

Assistant/Assoc. Professor, Biochemistry, Department of Natural Sciences 2009–2016

University of Washington, Seattle, WA

Graduate Teaching/Research Assistant, Department of Chemistry 2003–2008

Lead Teaching Assistant, Department of Chemistry, UW Washington 2005–2006

Honors and Awards

University of Minnesota

HHMI Faculty Fellow for Inclusive Excellence 2018

Diversity of Views and Experiences (DOVE) Fellowship 2012

Carl Storm Underrepresented Minority Fellowship traveling grant 2011

Gordon Research Conferences (GRC), Davidson College, Davidson, NC

External Awards/Honors

Jhumki Basu Scholar, National Association for Research in Science Teaching 2018

NARST Research Committee Member 2018

Editorial Board Review Member, Journal of Science Teacher Education (2016–19) 2016

Five-year Service Award certificate, Metropolitan State University, St Paul, MN 2014

Five-year Teaching Service Award, Metropolitan State University, St Paul, MN 2014

Research Scholar and various certificates for Undergraduate Research paper 2000

(UC San Diego; University of Texas Medical Branch; University of Alabama)

First Place Winner, the Physical Sciences, NSF/Alabama Louise Stoke 1999

Research, Scholarly, and Creative Work

Grants and Contracts

Grants Submitted But Declined

Principal Investigator

Agency: National Science Foundation

Title: CAREER: Microanalysis of teacher-initiated discourse moves (TDMs) in reform-based undergraduate STEM courses

Submitted: July 2018; Declined: December 2018

Requested amount: \$1,274,154

Principal investigator

Agency: National Science Foundation

Submitted: September 2017; Declined: November 2017

Title: In situ analysis of student experiences in reformed STEM learning environments

Requested amount: \$209,455

Principal Investigator

Agency: Spencer Foundation (LOI: Lyle Spencer Research Award)

Title: Measures of Student Engagement in Undergraduate STEM Learning Environments - A Longitudinal Study

Requested Amount: \$499,000

Declined: December 2017

Principal investigator

Agency: National Science Foundation

Title: CAREER: Microanalysis of Teacher-Initiated Discourse Moves in Reform-based Undergraduate Biology Courses

Direct costs: \$1,253,655

Declined: March 2017

Past Grants

Metropolitan State University

Investigator status: Principal investigator, Curriculum Development Grant

Title: Improving student understanding of solution processes

Direct costs: \$1,700

University of Washington Seattle

Investigator: Pre-doctoral Student (Advisor: Pradip Rathod)

Kirschstein-NRSA Individual Pre-doctoral Fellowship, NIH (application not funded)

Title: "Malarial Folylpolyglutamate Synthetase: Enzyme Specificity, Biochemical characterization And Its Effect on Folate and Antifolate Metabolism."

Research Publications

Refereed Journal Articles

^G Graduate student author

^U Undergraduate student co-author

^{CL} Collaborating colleague

^P Postdoctoral advisee author

^D Dissertation-related work

^{VS} Visiting Scholar in My Group

My authoring role: contributed to study: ^c conception and design | ^{d+} data collection, analysis, and interpretation | ^w writing and/or critically revising | ^s supervision | ^f Final approval of study | ^{ca} Corresponding author

10. **Warfa, A**^{D,c,d+,w}, Nyachwaya, J, & Roehrig, G. (2018). The Influences of Group Dialog on Individual Student Understanding of Science Concepts. *International Journal of STEM Education*, 5 (1), 46
9. Walker L^U & **Warfa A**^{c,d+,w,s,f,ca}. (2017) Process oriented guided inquiry learning (POGIL®) marginally affects student achievement measures but substantially increases the odds of passing a course. *PLoS ONE* 12(10): e0186203. <https://doi.org/10.1371/journal.pone.0186203>.
8. **Warfa, A**^{c,d+,w,s,f,ca}. (2016). Mixed Methods Research in Biology Education: Approach and Uses. Forthcoming, *CBE Life Science Education, December 1, Vol 15 (4)*.
7. **Warfa, A**^{c,d+,w,s,f,ca}. (2016). Using Cooperative Learning to Teach Chemistry: A Meta-Analytic Review. *J. Chem. Educ.*, 93 (2), pp 248–255
6. **Warfa, A**^{c,d+,w,s,f,ca} & Odowa, N^U (2015). Creative Exercises in the Biochemistry Domain – Analysis of Students’ linking of chemical and biochemical concepts. *Chem. Educ. Res. Pract.*, 16 (4), 747-757.
5. **Warfa, A**^{D,c,d+,w,s,ca}, Roehrig, G., Schneider, J., & Nyachwaya, J. (2014). The Role of Teacher-Initiated Discourses in Students’ Development of Representational Fluency in Chemistry. *J. Chem. Educ.*, 91 (6), pp 784–792.
4. **Warfa, A**^{D,c,d+,w,ca}, Roehrig, G., Schneider, J., & Nyachwaya, J. (2014). Collaborative Discourse and the Modeling of Solution Chemistry with 3D physical models – Impact and Characterization. *Chem. Educ. Res. Pract.*, 15, 835-848.
3. Nyachwaya, J. M., **Warfa, A**^{d+,w}, Roehrig, G. H., and Schneider, J. L. (2014). College chemistry students’ use of memorized algorithms in chemical reactions. *Chem. Educ. Res. Pract.*, 15, 81-93.
2. Nyachwaya, J. M., **Warfa, A**^{d+,w}, Roehrig, G. H., Wood, N. B., Kern, A. L., and Schneider, J. L. (2011). The Development of an Open-ended Drawing Tool: An Alternative Diagnostic Tool for Assessing Students’ Understanding of the Particulate Nature of Matter. *Chem. Educ. Res. Pract.*, 12, 121-132.
1. **Warfa, AbdiRizak Mohamed**^{c,d+,w,ca}. (2008). Effects of Active Learning Variants on Student Performance and Learning Perceptions. *International Journal for the Scholarship of Teaching and Learning*: Vol. 2: No. 2, Article 11.

Publications in Submission Phase

1. Kransfelder P^P, Lo AP^U, Melloy MP^U, Walker L^U, & Warfa A^{c,d+,w,s,f,ca}. Instructional practices in reformed undergraduate STEM learning environments: A study of instructor and student behaviors in biology courses. In review, *International Journal of Science Education*.
2. Petra Kransfelder^P, Jennifer L. Bankers-Fulbright^{VS}, Marcos E. García-Ojeda^{VS}, Marin Melloy^U, Sagal Mohammed^U, and Abdi-Rizak M. Warfa^{c,d+,w,s,f,ca}.

Evaluation and Other Reports

- 2012 “Strategies for Teaching Mathematics and Science in the Early Years,” a learning module (Module 4) for Somali Teachers Summer Institutes, a collaborative project of University of Minnesota faculty and members of the Somali Diaspora (Somali Diaspora and Advocates Pedagogy Project, SDAPP)

- 2012 "Teaching Mathematics and Science with Limited Resources," a learning module (Module 2) for Somali Teachers Summer Institutes, a collaborative project of University of Minnesota faculty and members of the Somali Diaspora (Somali Diaspora and Advocates Pedagogy Project, SDAPP).
- 2011-12 Evaluation Reports, University of Minnesota (Supervisor: Prof. Frances Lawrenz). An evaluation of the Triticeae Coordinated Agricultural Project (TCAP) (Co-authors, Mao Thao, Eric Moore, and Frances Lawrenz)

Media Interactions/Interviews

[Minnesota Daily \(November 14, 2018\): New research shows students learn better when interacting with classmates by Caitlin Anderson](#)

[College of Biological Sciences \(CBS\) Blog. *The Science of Learning Sciences: Teaching Biochemistry sparked a fascination with how students can best learn scientific concepts* by Julie Kendrick \(2017\).](#)

On the cover of: [BIO – College of Biological Sciences \(CBS\) Publication. *Fast Forward*](#). (Fall, 2017).

[Minnesota History Center, "Somalis + Minnesota" Exhibit](#) (Exhibit #36A, June 23rd, 2018).

Selected Conference Presentations

Petra Kranzfelder, Alexander T. Lo, Marin P. Melloy, Lindsey E. Walker, and Abdi-Rizak M. Warfa. The Classroom Discourse Observation Protocol (CDOP): A New Instrument to Characterize Teacher Discourse Moves, 2018, SABER National Meeting, Minneapolis, MN, July 27 – 29.

Walker L & **Warfa A.** "Process oriented guided inquiry learning (POGIL®) marginally affects student achievement measures but substantially increases the odds of passing a course." 2018 NARST Annual International Conference, Atlanta, GA, USA, March 10–13.

Warfa, A. "Mixed Methods Research in the Disciplines: Illustrations from Biology Education Research." Maximizing Insight from Mixed Methods Research: A Range of Perspectives, 2017 NARST Annual International Conference, San Antonio, TX, USA, April 22– 25.

Cotner, S & Warfa, A. "Biology Education Research at NARST: Opportunities for all." Symposium co-organizers, 2017 NARST Annual International Conference, San Antonio, TX, USA, April 22– 25.

Warfa, A., Roehrig. "Retroactive modeling activities (RMAs) for teaching biological concepts." Poster presentation, Modeling and Model-Based Reasoning in STEM, Purdue University, West Lafayette, IN, August 2016

Warfa, A., Roehrig, G., Schneider, J. "The role of POGIL activities in facilitating student discourse in chemistry." Paper presented at the Annual meeting of the American Chemical Society, Dallas, Texas, March 2014.

Warfa, A., Roehrig, G., Schneider, J. "Collaborative discourse and the construction of explanation with 3D Models in Chemistry ." Paper presented at the Annual meeting of the National Association for Research in Science Teaching, (NARST), Pittsburgh, PA, March 2014.

- Warfa, A.,** Roehrig, G., Schneider, J. "Improving student understanding of ionic compounds with POGIL instruction." Paper presented at the Annual meeting of the National Association for Research in Science Teaching, (NARST), Rio Grande, Puerto Rico, April 2013.
- Warfa, A.,** Roehrig, G., Schneider, J. "Targeting student misconceptions in chemistry with POGIL instructions." Paper presented at the 2nd annual meeting of Transforming Research in Undergraduate Science Education (TRUSE) in St Paul, MN, May 2012.
- Warfa, A.,** Nyachwaya, J., Wood, N., Kern, A., and Roehrig, G. "Student's Use of Covalent Bond Model to Represent Ionic Compounds." Paper presented at the Annual meeting of the Association for Science Teacher Educators, (ASTE), Indianapolis, IN, March 2012
- Nyachwaya, J., **Warfa, A.,** Wood, N., Kern, A., and Roehrig, G. "College Students' Understanding of the Particulate Nature of Matter across Reaction Types." Paper presented at the Annual meeting of the National Association for Research in Science Teaching, (NARST), Indianapolis, IN, April 2011
- Warfa, A.** "Transforming Traditional Labs into Inquiry-based Student-Centered Labs." Paper presented at Lily Conference on University and College Teaching, (Lily-West), Pomona, California, March 2008
- Warfa A,** Gunjar R, Muddepa D, and Rathod P. "Biochemical Characterization of *Plasmodium falciparum* Folypolyglutamate Synthetase (FPGS)." *Oral Paper Presentation*, 19th Annual Seattle Parasitology Meeting, Seattle, WA, May 2007.
- Warfa A,** Gujjar R, and Rathod K. "Activity of *Plasmodium falciparum* Folylpolylglutamate Synthetase (FPGS) on Natural Substrates and Folate-based DHFR-TS Inhibitors." Poster presented at Molecular Parasitology Meeting, Woods Hole, MA, September 2006
- Warfa A,** Davies D, Hol W "Expression and Purification of *Trypanosome brucei* Topoisomerase II.", *Poster Presentation*, Annual Meeting of the American Association for the Arts and Sciences (AAAS), Seattle, WA, Feb 2004.
- Warfa A,** Heidary DK, Jennings P. "Making and Purification of Interleukin-1 \square Mutant Proteins." University of Texas Medical Branch 14th Annual Undergraduate Research Symposium, Galveston, Texas. 2000; University of Alabama NSF/LSAMP Research Symposium, Birmingham, Al, 1999; and others.

Sample Invited Talks

- Panel Discussion, *Maximizing Insight from Mixed Methods Research: A Range of Perspectives*, 2017 NARST Annual International Conference
- Department of Chemistry and Biochemistry, University of California San Diego, Jan 2014, "The Use of Cooperative Learning Tools to Enhance Student Understanding of Chemistry"
- The Department of Chemistry, Western Washington University, Bellingham, WA, 2014, "The Influences of Sociochemical Dialogues on Student Conceptions of Ionic Compounds in Solution"
- 2014 Annual Meeting of Process-Oriented Guided-Inquiry Learning (POGIL) project; Washington University, St Louis, MO. Invited to participate roundtable discussions on assessment in chemistry, particularly assessment pertinent to the POGIL pedagogy
- The Role of Science in Conflict Resolution, The 2012 Annual Meeting of The Institute of Horn of Africa Studies and Affairs (IHASA), University of Minnesota

Services/Administration/Outreach Activities

University/College/ Department Services

University Level Services

- **Member, Graduate School Advisory Board (GSAB), Fall 2018-Present.** GSAB members advise the Graduate School on matters of strategic priority in graduate education as well as serve as representatives of, and advocates for, graduate education and postdoctoral training to the internal University and external communities.

College Level Services

- CBS Welcome Week Lab (Fall 2017): hosted first-year CBS students in an interactive presentation describing the research experiences and opportunities in our research group (Warfa Research Group).
- CBS Transfer Student Workshop (Fall 2017)– participated in panel discussion for undergraduate research experiences for newly admitted transfer CBS students
- CBS – Undergraduate Thesis Honors Reader (One student, Spring 2018).
- CBS: Market Science: Conducted workshop on most effective ways for communicating science, April 27, 2017.

Department Level Services

- Chair, Department Seminar Series Committee
- Biology Education PhD program (Worked with David Kirkpatrick, Sehoia Cotner, and Anita Schuchardt in laying the ground for the department's PhD program in biology education), which was approved in Spring 2018
- Member, Observations of Peer Teaching to Improve Instruction (OPT-IN) Committee
- Hosted department seminar speakers (Spring 2017, Fall 2017, Spring 2018, Fall 2018)

Recent Services to Science and Science Education Community

- **Symposium co-organizer**, Biology Education Research (BER), NARST 2017
- **Symposium co-organizer**, Chemistry Education Research (CER), NARST 2014
- **Session Presider**, NARST 2017, 2012-2014
- **Program proposal reviewer**, ASTE National Meeting, 2011, 2012, 2016
- **Program proposal reviewer**, NARST National Meeting, 2010, 2011, 2012, 2014, 2017
- **Reviewer:** CBE-Life Science Education, Chemistry Education Research and Practice, Journal of Chemical Education

Undergraduate Research Advisees (N = 7)

Marin Molley (2017 – Present)
Sagal Mohamed (Spring 2018 – Present)
Vinit Vaghani (Spring 2018)
Lindsey Walker (2017 – 2018)
Alex T. Lo (Fall 2017)
Salma Ahmed (Spring 2017)
Meghan Abdirahman (Spring 2017)

Graduate Students (N = 1)

Doctoral Committee Member, Lynne Shenk (Science Education, CEHD).

Professional Associations

National Association for Research in Science Teaching (NARST)
American Chemical Society (ACS)

Other Skills

Fluent in Somali Language (written and spoken, native language)
Fluent in Arabic Language (fluent in written and reading, conversational in spoken)