Curriculum Vitae

I. PERSONAL DATA

Name
Frackson Mumba
Phone 4342433651; Email: mumba@virginia.edu

Affiliation
Department of Curriculum, Instruction and Special Education, School of Education and Human Development, Bavaro Hall 321, University of Virginia

Area of Specialization
Science Education. A focus on *Science Teacher Professional Knowledge*

RESEARCH INTEREST
Science Teacher Professional Knowledge
Areas:

- Engineering design integration in science education- *curriculum materials, teacher knowledge, implementation, and student learning outcomes*.
- Language & Literacy integration in science teaching- *curriculum development, teacher knowledge and implementation in science classroom*.
- Inquiry science instruction and learning outcomes- *curriculum materials, science labs & science teacher learning*.

EDUCATION
Ed.D. Science Education, Illinois State University, Normal, IL, USA, 2005
MSc. Science Education, Witwatersrand University, Johannesburg, South Africa. 2001
BSc. Ed. Chemistry Major & Physics Minor, University of Zambia, Lusaka, Zambia, 1993

PROFESSIONAL POSITIONS & AFFILIATIONS

2013-present:	Associate Professor, Science Education, Department of Curriculum, Instruction & Special Education, School of Education and Human Services, University of Virginia
2014-2015	Secondary Teacher Education Coordinator, Department of Curriculum, Instruction & Special Education, School of Education and Human Services University of Virginia
2010-2013:	Associate Professor, Science Education, Department of Curriculum and Instruction, Southern Illinois University Carbondale
2010-2013:	Associate Professor (Joint appointment), Department of Chemistry and Biochemistry, Southern Illinois University Carbondale
2005-2009:	Assistant Professor of Science Education, Department of Curriculum and Instruction, Southern Illinois University Carbondale
2007-2013:	Director of Teaching Excellence in Mathematics and Science (TEMS), Department of Curriculum and Instruction, Southern Illinois University Carbondale, IL
2001-2005:	Research Associate, National Science Foundation GK-12 PRISM Project, Departments of Chemistry & Biological Sciences, Illinois State University, Normal, IL
2004:	Graduate Teaching Assistant, Department of Chemistry, Illinois State University
2002:	Instructor, General Chemistry labs, Department of Chemistry, Illinois State University
2001:	Graduate Teaching Assistant, General Chemistry Lab, Department of Chemistry, Illinois State University
1999-2000:	Instructor, General Chemistry Labs & Tutorials, Department of Chemistry, Witwatersrand University, Johannesburg, South Africa
1999- 2000:	Research Associate - Chemistry Education, Department of Chemistry, Witwatersrand University, South Africa

1998-2001: Staff Development Fellow, Chemistry Education, Department of Mathematics and Science Education, School of Education, University of Zambia, Zambia
1994-1998: Chemistry & Physics Teacher, Dominican Convent Girls Catholic High School, Zambia

II. SCHOLARSHIP

PUBLICATIONS

In science education, there are three types of peer-reviewed journals in which scholars disseminate scholarship outcomes(Subject specific, general STEM education, and practitioner journals).They are all peer-reviewed journals.

Peer-reviewed Journal Articles

*Note: *Indicates current or former student or postdoctoral fellow co-author.*

1. *Ojeogwu, J. Mumba, F. (Accepted for publication). Developing Secondary Pre-Service Science Teachers' Self-Efficacy for Teaching Engineering. *International Journal of Engineering Education.*

2. *Ojeogwu, J. Mumba, F. (2025). Preparing pre-service teachers in engineering design integrated science teaching: A systemic review. *Journal of Science Education and Technology*. *https://doi.org/10.1007/s10956-025-10247-8*

3. *Pottmeyer, L. & Mumba, F. (2025). Student Learning Outcomes in Science and Engineering Integrated Instruction . *Journal of STEM Education: Innovations and Research*, *26*(2), 26–36. https://doi.org/10.63504/jstem.v26i2.2721;

4. Mumba, F., Chiu, J, & Bailey, R. (2025). Creating engineering design integrated science units and lessons. *School Science and Mathematics*. https://doi.org/10.1111/ssm.18346

5. Mumba, F., *Rutt, A., Bailey, R., *Pottmeyer, L., *van Aswegen, R., Chiu, J., & *Ojeogwu, J. (2024). A model for integrating engineering design into science teacher education. *Journal of Science Education and Technology*, *33*(1), 45-56. https://doi.org/10.1007/s10956-023-10055-y

6. Mumba, F. *Pottmeyer, L, *Rutt, A., Asunda, P. & Bailey, R. & (2023). Developing secondary pre-service science teachers' understanding of science and engineering practices, engineering design process, and scientific method. *Journal of STEM Teacher Education*, 58(1), 50-69. DOI: https://doi.org/10.61403/2158-6594.1500

7. *Rutt, A. A., & Mumba, F. (2023). Examining preservice science teachers' implementation of language-and literacy-integrated science through a cultural historical activity theory lens. *Science Education*, *107*(3), 773-809. https://doi.org/10.1002/sce.21775

8. Mumba, F., *Rutt, A., & Chabalengula, V. M. (2023). Representation of science and engineering practices and design skills in engineering design-integrated science units developed by pre-service teachers. *International Journal of Science and Mathematics Education*, *21*(2), 439-461. https://doi.org/10.1007/s10763-022-10266-6

9. *Rice, M., Mumba, F., & *Pottmeyer, L. (2022). Learning about Osmosis through Engineering Design Process. The American Biology Teacher, 84(5), 297-307. https://doi.org/10.1525/abt.2022.84.5.297

10. *Rutt, L. & Mumba, F. (2022). Pre-service teachers' enactment of language- and literacy-integrated science instruction in linguistically diverse science classrooms. *Journal of Research in Science Teaching. 59 (4), 619-655.* https://doi.org/10.1002/tea.21739

11. Mumba, F., *Pottmeyer, L. O., & Chabalengula, V. M. (2021). Analysis of articles in the American Biology Teacher for Essential Features of inquiry representation. *Research in Science Education*, *51*(5), 1247-1267. https://doi.org/10.1007/s11165-019-09906-9

12. *Rutt, A., Mumba, F., & Kibler, A. (2021). Preparing preservice teachers to teach science to English Learners: A review. *Journal of Research in Science Teaching*, *58*(5), 625-660. https://doi.org/10.1002/tea.21673

13. *Rutt, A. & Mumba, F. M. (2020). Developing secondary pre-service science teachers' instructional planning abilities for language-and literacy-integrated science instruction in linguistically diverse classrooms. *Journal of Science Teacher Education*, *31*(8), 841-868. https://doi.org/10.1080/1046560X.2020.1760431

14. *Rutt, A., & Mumba, F. (2019). Developing preservice teachers' understanding of and pedagogical content knowledge for history of science–integrated science instruction. *Science & Education*, *28*(9), 1153-1179. https://doi.org/10.1007/s11191-019-00089-3

15. Wheeler, L., *Sturtevant, H., & Mumba, F. (2019). Exploratory study of the impact of a teaching methods course for international teaching assistants in an inquiry-based general chemistry laboratory. *Journal of Chemical Education*, *96*(11), 2393-2402. https://doi.org/10.1021/acs.jchemed.9b00239

16. *Holder, T., *Ochs, L. & Mumba, F. (2019). Slime mold quarantine: An engineering design integrated biology unit. *American Biology Teacher*, 81(8)570-576. https://doi.org/10.1525/abt.2019.81.8.570.

17. Mumba, F., *Miles, E. & Chabalengula, V.M. (2018). Elementary education in-service teachers' familiarity, interest, conceptual knowledge and performance on science process skills. *Journal of STEM Teacher Education, 53(2), 23-43*. https://doi.org/10.30707/JSTE53.2Mumba

18. Mumba, F. *Banda, A. & Chabalengula, V.M. (2018). Junior high school pre-service science teachers' familiarity, conceptual understanding and interest in electrochemistry. *African Journal of Research in Mathematics, Science and Technology Education. 22:2, 149-161.* https://doi.org/10.1080/18117295.2018.1475282;

19. Chabalengula, V.M., *Bendjemil, S. A., Mumba, F. (2017). Engineering design skills coverage in K-12 engineering program curriculum materials in the USA. *International Journal of Science Education, 37(16),* 2209-2225. https://doi.org/10.1080/09500693.2017.1367862

20. Chabalengula, V.M., *Bendjemil, S. A., Mumba, F. & Chiu, J. (2017). Nature and extent of science and engineering practices coverage in K-12 and engineering curriculum materials. *International Journal of Engineering Education*, 33(1B), 308-320;

21. Chabalengula, V.M, *Fateen, R., Mumba, F. & *Ochs, L.K. (2016). Effect of inquiry-based computer simulation modeling on pre-service teachers' understanding of homeostasis and their perceptions of design features. *Journal of Computers in Mathematics and Science Teaching*, 35 (3), 225–248.

22. *Banda, A., Mumba, F., & Chabalengula, V.M. (2016). Mufulira secondary school pupils' familiarity, interest and conceptual understanding of selected chemistry concepts. *Zambia Journal of Teacher Professional Growth*,*3*(1),19 – 30

23. Mumba, F. *Banda, A. & Chabalengula, V.M. (2015). Chemistry teachers' perceived benefits and challenges of inquiry-based instruction in Chemistry Classrooms. *Science Education International, 26*(2), 180-194.

24. Mumba, F., *Mbewe, S. & Chabalengula, V.M. (2015). Elementary school teachers' familiarity, conceptual knowledge, and interest in light. *International Journal of Science Education, 37*(2), 185-209. https://doi.org/10.1080/09500693.2014.971906

25. Mumba, F., Chabalengula, V.M, & *Banda, A. (2014). Comparing male and female pre-service teachers' understanding of the particulate nature of matter. *Journal of Baltic Science Education, 13*(6), 821-827.

26. *Banda, A., Mumba, F. & Chabalengula, V.M. (2014). Zambian pre-service chemistry teachers' views on chemistry education goals and challenges for achieving them in schools. *Science Educator, 23*(1), 56-64.

27. Bergman, J. M., Boesdorfer, S. B., Carver, J. S., Mumba, F., & Hunter, W. J. F. (2013). Teaching atomic theory using photoelectron spectroscopy data. *The Chemical Educator, 18*, 1-5.

28. Chabalengula, V.M. & Mumba, F. (2013). Inquiry-based science education: A scenario on Zambia's High School Science Curriculum. *Science Education International, 23* (4), 307-327.

29. Mumba, F. & Zhu, M.(2013). Development of an innovative interactive virtual classroom system for K-12 education using Google App Engine. *Journal of Computers in Mathematics and Science Teaching, 32*(2), 195-217.

30. Lingguo, B., Mumba, F., *Henson, H. & Wright, M. (2013). GeoGebra in professional development: The experience of rural in-service elementary school (K-8) teachers. *Mevlana International Journal of Education, 3*(3): 64-76. Special Issue: Dynamic and Interactive Mathematics Learning Environment.

31. *Szyjka, S. & Mumba, F. (2012). Psychometric reconstruction of the inquiry science teaching strategies (ISTS) instrument. *Journal of Baltic Science Education, 11*(1),55-66.

32. Chabalengula, V.M. & Mumba, F. (2012). Promoting biological knowledge generation using model-based inquiry instruction. *International Journal of Biology Education, 2*(1), 1-24.

33. Chabalengula, V.M. Mumba, F. & *Mbewe, S. (2012). How pre-service teachers' understand and perform science process skills. *Eurasia Journal of Mathematics, Science and Technology Education, 8*(3), 113-122. https://doi.org/10.12973/eurasia.2012.832a

34. *Syzjka, S. & Mumba, F. & Wise, K. (2012). Confirmatory factor analysis of the questionnaire of attitude toward statistical graphs for use in science education. *Journal of Baltic Science Education, 11*(1), 55-66.

35. Chabalengula, V. M., Sanders, M. & Mumba, F. (2012). Diagnosing students' understanding of energy and its related concepts in a biological context. *International Journal of Science and Mathematics Education, 10*(2), 241-266. https://doi.org/10.1007/s10763-011-9291-2

36. *Mbewe S., Mumba, F. Chabalengula, V.M. & *Banda, A. (2012). Assessing mathematics and science teachers' reformed teaching through examination of inquiry-based pedagogical practices. *Journal of Research and Practice of International Cooperation in Science, Mathematics and Technology Education, 3*(1), 20-34.

37. *Banda, A., Mumba, F., Chabalengula, V. M. & *Mbewe, S. (2011). Teachers' understanding of the particulate nature of matter: The case of Zambian pre-service science teachers. *Asia-Pacific Forum on Science Learning and Teaching,12* (2), 1-7.

38. Chabalengula, V.M., Mumba, F., & *Chitiyo, J. (2011). American elementary education pre-service teachers' attitudes towards biotechnology processes. *International Journal of Environmental and Science Education, 6*(4), 341-357.

39. *Syzjka, S. & Mumba, F. & Wise, K. (2011). Cognitive and attitudinal predictors related to line graphing achievement among elementary pre-service teachers. *Journal of Science Teacher Education, 22* (7), 563-578. https://doi.org/10.1007/s10972-010-9207-y

40. Chabalengula, V. M., Mumba, F. & *Chitiyo, J. (2011). Elementary education pre-service teachers' understanding of biotechnology and its related processes. *Biochemistry and Molecular Biology Education, 39*(4), 321-325. https://doi.org/10.1002/bmb.20505

41. Bergman, J., Boesdorfer, S., Carver, J.S., Mumba, F. & Hunter, W. (2010). Student learning on atomic theory using the PES Data Method. *Chemical Educator, 15*, 370-375.

42. Mumba, F. Chabalengula, V.M., & *Mejia W. (2010). Resident scientists inquiry practice and their perceived benefits and difficulties of Inquiry in schools. *Journal of Baltic Science Education, 9*(3), 187-195.

43. *Syzjka, S. & Mumba, F. (2009). Model for preparing science teachers for inclusive classrooms. *Southeastern Journal of Teacher Education, 2*(4), 1-12.

44. Mumba, F., *Wilson-Miles, E., Chabalengula, V.M. *Mejia, W. F. & *Mbewe, S. (2009). Elementary education preservice teachers' attitude towards graphs. *Journal of Baltic Science Education, 8*(3), 172-181.

45. Mumba, F., & Hunter, W. F.J. (2009). Representative nature of scientific literacy themes in a high school chemistry course: the case of Zambia. *Chemical Education: Research and Practice, 10*, 219-226. DOI: 10.1039/B914501J.

46. Mumba, F. Carver, J., Chabalengula, V.M. & Hunter, W. (2009). Chemistry teaching fellows' understanding of the nature of scientific theories and laws. *Journal of Baltic Science Education, 8*(1), 15-21.

47. Chabalengula, V.M., Mumba, F., Lorsbach, A. & Moore, C. (2008). Curriculum and instructional validity of the scientific literacy themes covered in Zambian high school biology curriculum. *International Journal of Environmental and Science Education, 3*(4), 207-220. *GS cites: 53times*

48. Bacchus, C., Mumba, F. Chabalengula, V., & Bassoppo-Moyo, T. C. (2007) Hypermedia versus traditional classroom instruction: A look at the research designs, methods, and theoretical perspectives. *International Journal of Instructional Media, 34*(3), 255-265.

49. Mumba, F., Chabalengula, V.M., & Wise, K (2007). Analysis of new Zambian high school physics syllabus and practical examinations for levels of inquiry and inquiry skills. *Eurasia Journal of Mathematics, Science and Technology Education, 3*(3), 213-220. https://doi.org/10.12973/ejmste/75400

50. Mumba, F., & Tsige, M. (2007). Finding the density of objects without measuring mass and volume. *Physics Education, 42*(3), 293-295. *DOI 10.1088/0031-9120/42/3/010*

51. Mumba, F., Chabalengula, V.M. & Hunter, W. (2007). Inquiry levels and skills in Zambian high school chemistry syllabus, textbooks and practical examinations. *Journal of Baltic Science Education, 6*(2), 50-57.

52. Mumba, F., Chabalengula, V.M., Cynthia M., & Hunter, W. (2007). Mathematics and science Teaching Fellows' instructional planning for K-12 Classrooms. *Science Educator, 16*(2), 38-43.

53. Mumba, F., Chabalengula, V. & Hunter, W. (2006). A Quantitative analysis of Zambian high school physics for scientific literacy. *Journal of Baltic Science Education, 2*(10), 70-76.

54. Mumba, F., Chabalengula, V. M., & Bassoppo-Moyo, T. C (2006). Ethical and educational justification for computer-based instruction: A case of simulations in science teaching. *International Journal of Instructional Media, 33*(4), 405-414.

55. Mumba F., Vivien M. Chabalengula, Hunter, J. F., Moore, C., Grogg, J., Thornton, C., & Plantholt, M. (2003). An exploration of the content and nature of reflective practices of graduate teaching fellows in a school-university partnership project. *The Chemical Educator, 8*(6), 404-412.

56. Mumba, F., Rollnick, M., & White, M. (2002). How wide is the gap between high school and first-year university chemistry at the University of the Witwatersrand? *South African Journal of Higher Education 16*(3), 148-157.

57. Rollnick, M., Green, G., White, M., Mumba, F. & Bennett, J. (2001). Profiles of first year and access chemistry students views of the study of chemistry. *African Journal of Research in Mathematics, Science and Technology Education, 5*(1), 13-28. https://doi.org/10.1080/10288457.2001.10756126;

Articles in Edited Volumes

58. *Mbewe, S., Chabalengula, V.M. & Mumba, F. (2010). Pre-service teachers' familiarity, interest and conceptual understanding of science process skills. In V. Lamanausakas (Ed.). *Problems of Education in the 21st Century: Current Research on ICT and Science Education, Vol. 22*, 76-86.

59. Chabalengula, V.M. & Mumba, F., Hunter, W. & *Wilson, E. (2009). A model for assessing manipulative skills during science labs. In V. Lamanausakas (Ed.).*Problems of Education in the 21st Century: Recent Issues in Science and Technology Education, Vol. 11*, 28-36.

60. Mumba, F., Chabalengula, V.M., *Wilson, E.N., Carver, J. & Hunter, W.F.J. (2009). Resident scientists' conceptions of science teaching. In V. Lamanausakas (Ed.). *Problems of Education in the 21st Century: Recent Issues in Science and Technology Education, Vol. 11*, 129-138.

61. Mumba, F., *Mbewe, S., *Sasser, S., Chabalengula, V.M., & *Wilson-Miles, E. (2009). Resident Scientists' Curriculum and Instructional Decisions for High School Classrooms. In V. Lamanausakas (Ed.). *Problems of Education in the 21st Century: Didactics of natural Sciences Education and Information & Communication Technologies, Vol. 17*, 125-133.

62. Mumba, F., & Chitiyo, M. (2008). High school chemistry teachers' curriculum and instruction decisions for inclusive classroom. In V. Lamanausakas (Ed.). *Problems of Education in the 21st Century: Recent Issues in Science and Technology Education, Vol. 9*, 74-80. *GS cites: 10*

Book Chapters

1. Chabalengula, V. M. & Mumba, F. (2022). Multicultural Science Content and Contexts in Zambian Science Curriculum Materials. In M. Atwater (Ed.), International Handbook of Research on Multicultural Science Education. Chapter 28 (pp.747-776). Springer. ISSN 2197-1951.

2. Chabalengula, V. M. & Mumba, F. (2020). Science and engineering practices coverage in science practical activities: Analysis of Zambia's Integrated Science Curriculum Materials. In U. Ramnarain, (Ed.). (2020). *School Science Practical Work in Africa: Experiences and Challenges.* Routledge.

3. Mumba, F., *Ochs, L., *Rutt, A. & Chabalengula, V. M. (2018) Constructing explanatory arguments based on evidence gathered while investigating natural phenomena in a methods course for middle school students. In J. Rhoton (Ed.). *Preparing teachers for three-dimensional instruction.* National Science Teachers Association (NSTA) Press.

4. Chabalengula, V. M. & Mumba, F. (2012). Understanding energy conservation: intersection between the biological and everyday life contexts. In A. Z. Ahmed (Ed.), *Energy Conservation*, ISBN 979-953-307-1023-8. *GS cites: 4*

5. Bu, L., Mumba, F., Wright, M., & Henson, H. (2012). Teaching mathematics using GeoGebra: Integrating pedagogy and content in teacher education. In D. Martinovic, D. McDougall & Z. Karadag (Eds.), *Technology in Mathematics Education: Contemporary Issues* (pp. 91-115). Informing Science Press.

Peer-reviewed abstracts & conference proceedings

**Text denote current or former student.*

1. *Ojeogwu, J., Rodriguez, J., Mumba, F. & Cox, A. (2023). Developing elementary teachers' Virtual science instruction. In E. Langran, P. Christensen & J. Sanson (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference* (pp. 1766-1775). New Orleans, LA, United States: Association for the Advancement of Computing in Education (AACE). Retrieved May 3, 2023, from https://www.learntechlib.org/primary/p/222210/.

2. *Ojeogwu, J. & Mumba, F. (2022). Beliefs about inquiry and science teaching self-efficacy of GTAs after inquiry methods Course. *Proceedings of the Association for Science Teachers Education (ASTE) Conference*, Greenville, SC, January 5-8, 2022.

3. Mumba, F. &_*Ojeogwu, J. (2022). Graduate Teaching Assistants' conceptions of science teaching and self-efficacy for inquiry. *Proceedings of the Association for Science Teachers Education (ASTE)*, Greenville, SC, January 5-8, 2022.

4. *Rutt, A. & Mumba, F. (2021). Pre-service teachers' language-and literacy-integrated science instruction through a cultural historical activity theory lens. *Proceedings of the American Educational Research Association Annual International Conference*, virtual, April 2021.

5. *Rutt, A. & Mumba, F. (2021). Secondary science pre-service teachers' enactment of language- and literacy-integrated science instruction in linguistically diverse classrooms. *Proceedings of the National Association for Research in Science Teaching Annual International Conference*, virtual, April 2021.

6. *Rutt, A. & Mumba, F. (2021). Secondary science PSTs' instructional planning for language- and literacy-integrated science. *Proceedings of the Association for Science Teacher Education Annual International Meeting*, Salt Lake City, UT, January 2021.

7. *Pottmeyer, L. & Mumba, F. (2020). Impact of engineering design integrated science instruction on student learning outcomes. *Proceedings of the National Association for Research in Science Teaching (NARST) Conference*, Virtual, March 15-18, 2020; Portland, OR.

8. Mumba, F. (2019). Impact of engineering design integrated science teaching on student perceptions of engineering design. *Science Conference*, Pusan National University, Busan, South Korea; Dec 21, 2019.

9. Mumba, F. (2019). Pre-service Science Teachers' Understanding of Engineering Design and Scientific Method. *Proceedings of the 13th European Science Education Research Association (ESERA) Conference*, Aug. 26-30, 2019; Bologna, Italy.

10. Mumba, F, Wheeler, L, Chabalengula, V.M. & & *Ochs, L. (2019). Developing Chemistry Teaching Assistants' Pedagogical Orientations towards Inquiry Instruction. *Proceedings of the American Educational Research Association (AERA) Meeting*, April 5-9, 2018; Toronto, Canada.

11. Chabalengula, V.M., Mumba, F., & *Ochs, L. (2019). Chemistry Teaching Assistants' Beliefs in Project-Based Guided Inquiry Instruction. *Proceedings of the American Educational Research Association (AERA) Meeting*, April 5-9, 2018; Toronto, Canada.

12. Mumba, F., Ochs, L., & *Rutt, A. (2019). Developing Pre-Service Science Teachers' Understanding of the Engineering Design Process and the Scientific Method. *Proceedings of the National Association of Research in Science Teaching (NARST) Annual International Conference*. Baltimore, MD, USA. March 31 - April 3, 2019.

13. Mumba, F. Rollnick, M., Toerien, R, (2019). PCK for Teaching Chemical Bonding of TAs Compared to Teachers. *Proceedings of the National Association of Research in Science Teaching (NARST) Annual International Conference*. Baltimore, MD, USA. March 31 - April 3, 2019.

14. Chabalengula, V.M. & Mumba, F. (2019). Science and Engineering Practices Coverage in Zambia's Integrated Science Curriculum. *Proceedings of the National Association of Research in Science Teaching (NARST) Annual International Conference*. Baltimore, MD, USA. March 31 - April 3, 2019.

15. Chabalengula, V.M. & Mumba, F. (2019). Impact of PBGI instruction on Chemistry Teaching Assistants' Pedagogical Orientations and Conceptions of Science Teaching. *Proceedings of the Southern African Association for Mathematics, Science, Technology Education Conference*, Durban, South Africa, 15-17, January 2019.

16. Rollnick, M., Toerien, R. & Mumba, F. & Davidowitz, B. (2019). Is PCK for teaching chemical bonding only possessed by teachers? *Proceedings of the Southern African Association for Mathematics, Science, Technology Education Conference*, Durban, South Africa, 15-17, January 2019.

17. Mumba F., Toerien, R., Rollnick, M., & Davidowitz, B. (2019). Comparing south African and us chemistry teaching assistants' TSPCK for chemical bonding. *Proceedings of the Southern African Association for Mathematics, Science, Technology Education Conference*, Durban, South Africa, 15-17, January 2019.

18. Mumba, F. & *Rutt, A. (2019). Developing Preservice Teachers' Content and Pedagogical Content Knowledge for the History of Science Integrated Science Instruction. *Proceedings of the Association of Science Teacher Education (ASTE) Conference*, Savannah, Georgia, GA, January 3-5, 2019.

19. *Rutt, A., Mumba, F. & Kibler, A. (2019). Preparing Preservice Teachers to Teach Science to English Learners: A Review of Literature. *Proceedings of the Association of Science Teacher Education (ASTE) Conference*, Savannah, Georgia, GA, January 3-5, 2019.

20. Mumba, F., *Ochs, L., Rollnick, M. & Toerien, R. (2018). US Chemistry Teaching Assistants' Knowledge of Chemical Bonding & the Explanatory Principles they use to Explain it. *Proceedings of the Southern African Association for Mathematics, Science, Technology Education Conference*, Gaborone, Bostwana, 16-19, January 2018.

21. Mumba, F. (2018). Engineering Design in Science Teacher Education Project: Teachers' Pedagogical Knowledge for Engineering Design Integrated Science Teaching, and Student Learning. *Proceedings of the Southern African Association for Mathematics, Science, Technology Education Conference* Gaborone, Bostwana, 16-19, January 2018.

22. *Ochs, L. Mumba, F. & Chiu, J. (2018). Pre-Service Teachers' Identification of NGSS Engineering and Science Practices in a Sample Lesson Plan. *Proceedings of the Association of Science Teacher Education (ASTE) Conference*, Baltimore, MD, January 3-6, 2018.

23. *Rutt, A. & Mumba, F. (2018). Middle School Science Teachers' Pedagogical Orientations Towards Inquiry Instruction. *Proceedings of the Association of Science Teacher Education (ASTE) Conference*, Baltimore, MD, January 3-6, 2018.

24. Mumba, F. & *Ochs, L. (2018). A model for determining the nature and extent of integration in Engineering Design and Science Integrated Activities. *Proceedings of the Association of Science Teacher Education (ASTE) Conference*, Baltimore, MD, January 3-6, 2018.

25. Mumba, F, & Wheeler, L. (2017). Developing US Teaching Assistants' Pedagogical Knowledge of Inquiry Science Teaching and Assessing the impact on Student Learning. *Proceedings of 25th Southern African Association for Mathematics, Science, Technology Education Conference*, Bloemfontein, South Africa, 17-20, January 2017.

26. Mumba, F. & *Ochs, L. (2017). US Middle School Science Teachers' Conceptions of Inquiry. *Proceedings of 25th Southern African Association for Mathematics, Science, Technology Education Conference*, Bloemfontein, South Africa, 17-20, January 2017.

27. *Ochs, L. & Mumba, F. (2017) Pre-Service Teachers' Perceived Relevance of Engineering Practices in Science Teaching. *Proceedings of Southern African Association for Mathematics, Science, Technology Education Conference*, Bloemfontein, South Africa, 17-20, January 2017.

28. Mumba, F., *Blankenship, S., Hunter, W. & Carver, J. (2016). *Inquiry Representation in the Journal of Chemical Education*. Proceedings of 251st ACS National Meeting & Exposition. San Diego, CA, March 13-17, 2016

29. Mumba, F., Zhu, M., Ma, J. & Ahmed, S. (2012). New Design and Implementation of a Virtual Classroom System Using Google App Engine. In P. Resta (Ed.), *Proceedings of SITE 2012--Society for Information Technology & Teacher Education International Conference* (pp. 698-705). Austin, Texas, USA: Association for the Advancement of Computing in Education (AACE). Retrieved December 16, 2017 from https://www.learntechlib.org/p/39653/.

30. Chabalengula, V.M., Mumba, F., Zhu, M., *Banda, A., *Mbewe, S. & *Miles, E. (2011). Science Teachers Familiarity of and Interest in Computer Simulations, Animations, Visualization, Modeling and Virtual reality. In M. Koehler & P. Mishra (Eds.), *Proceedings of SITE 2011--Society for Information Technology & Teacher Education International Conference* (pp. 2075-2077). Nashville, Tennessee, USA: Association for the Advancement of Computing in Education (AACE). Retrieved December 17, 2017 from https://www.learntechlib.org/p/36610/.

31. Mumba, F., Zhu, M. & Cheng, C.C. (2011). An Interactive Simulation based Virtual Classroom System using Cloud Computing Technology. In M. Koehler & P. Mishra (Eds.), *Proceedings of SITE 2011--Society for Information Technology & Teacher Education International Conference*

(pp. 2171-2176). Nashville, Tennessee, USA: Association for the Advancement of Computing in Education (AACE). Retrieved December 17, 2017 from https://www.learntechlib.org/p/36627/.

32. Bu, L., Mumba, F., *Henson, H. & Wright, M. (2011). Improving Teachers' Attitudes Toward Mathematics Teaching: Model-Centered Learning and Open-Source Learning Technology. In M. Koehler & P. Mishra (Eds.), *Proceedings of SITE 2011--Society for Information Technology & Teacher Education International Conference* (pp. 180-184). Nashville, Tennessee, USA: Association for the Advancement of Computing in Education (AACE). Retrieved December 17, 2017 from https://www.learntechlib.org/p/36254/

Grants total ≈ $13M,

External Funding ($12,740,646)

1. **Principal Investigator (PI)-** (co-PIs Reid Bailey, Dean Herman, Vivien Chabalengula). Preparing Pre-service Science Teachers to Integrate Engineering Design, Language, and Literacy in Science Teaching. **National Science Foundation**, **$1,200,000**; 2023-2027. **DUE**, **Award Number : 2243516**

2. **Principal Investigator (PI)** -Developing Teachers' Pedagogical Knowledge for Engineering Design Integrated Science Teaching. **Fulbright US Scholars Award, Fulbright Program, $83,350. Department of State (Bureau of Educational and Cultural Affairs**). Award to Zambia for Academic year 2023-2024.

3. **Principal Investigator (PI)** (Co-PIs Robert Tai, Jennie Chiu, Larry Richards, Vivien Chabalengula). *University of Virginia Noyce Scholarship Program*. Supplemental funding. **National Science Foundation**, **$256,000**; 2014-2019. **DUE, Award Number: 1439858**

4. **Principal Investigator (PI)** (Co-PIs Lindsay Wheeler, Robert H. Tai, Ji Hoon Ryoo, Claire Cronmiller & Maksim Bychkov). *Developing Teaching Assistants' Pedagogical Knowledge of Inquiry Science Teaching & Instructional Leadership Skills, and Assessing the impact on Student Learning*. **National Science Foundation**; **$599,482**; 2016-2022. **DUE, Award Number:1626249**

5. **Principal Investigator (PI)** (Co-PIs Jennie Chiu, Reid Bailey & Ji Hoon Ryoo). *Developing Pre-service Teachers' Pedagogical Content Knowledge for Engineering Design Integrated Science Teaching, and Assessing the Impact on Student Learning*. **National Science Foundation**, **$325,000**; 2016-2022. **Award Number :1636443**

6. **Principal Investigator (PI)** (Co-PIs Ed Murphy, & Vivien Chabalengula). *Partnership for Achievement in Science in Southwest Virginia (PASS-VA*. Funded by **State Council for Higher Education for Virginia(SCHEV*), $150,000**; 2015-2016.

7. **Principal Investigator** (**PI**) (Co-PIs Robert Tai, Jennie Chiu, Larry Richards, Vivien Chabalengula). *University of Virginia Robert Noyce Scholarship Program*. Funded by **National Science Foundation**, **$1,284,321**; 2014-2021. **DUE**, **Award Number: 1439858**

8. **Co-PI** (PI-Richard Lindgren & Co-PI Jennifer Maeng). *Developing Grades 6-12 Science Teacher Leaders' Understanding of Electricity, Magnetism and Light via Modeling and Inquiry. Mathematics and Science partnership Program*. Funded by **Virginia Department of Education**, **$227,069**; 2014-2015.

9. **Co-PI** (PI Candace Lutzow-Felling, Co-PIs Michael Kennedy & Robert Tai). *Developing Teacher-Leaders in Integrated Math and Science for Inclusive Classrooms. Mathematics and Science Partnership Program*. Funded by **Virginia Department of Education**, **$203,108;** 2014-2015.

10. **Co-PI** (PI-Karen Renzaglia, & Co-PIs Harvey Henson, Tim Bellamey, & Lingguo Bu). *A Community of Problem Solvers: Teachers Leading Problem-Based Learning in Southern Illinois. Master Science Teacher Fellows Program*. Funded by **National Science Foundation**, **$3,250,000***;* 2011-2017. **DUE**, **Award Number: 1136414**

11. **Principal Investigator (PI)** (Co-PIs Mengxia Zhu & Shaikh Ahmed). *Partnership for Improved Achievement in Science through Computational Science (PIASCS)*, Funded by **Illinois State Board of Education, $530, 000***;* 2009-2012.

12. **Principal Investigator (PI)** (Co-PIs Mary Wright, Harvey Henson & Lingguo Bu). *Science, Mathematics and Action Research for Teachers (SMART), MSP Graduate Program*. Funded by **Illinois State Board of Education; $1,500,000**; 2007-2013.

13. **Co-PI** (PI -Karen Renzaglia, Co-PIs: Sedonia Sipes, Harvey Henson & David Gibson). *Heartland Partnerships: Inquiry-Based Ecological and Environmental Education at SIUC.* Funded by **National Science Foundation*, NSF GK-12,* $1,862,457***;*** 2007-2013. **DUE**, **Award Number: 0638722**

14. **Principal Investigator (PI)** (Co-PIs Mary Wright, Harvey Henson & Lingguo Bu). *Southern Illinois Partnership for Achievement in mathematics and Science (SIPAMS)*. Funded by **Illinois Board of Higher Education (IBHE)**, **$1,000,000***;* 2010-2014.

15. **Co-PI** (PI Jay Means & Co-PI Harvey Henson). *New Energy Workforce Systems (NEWS) Project.* Funded by **Department of Labor** and West Kentucky Community College, Awarded **$30,000**; 2009-2012.

16. **Co-PI** (PI-Mary Wright, & Co-PIs-Harvey, Karen Renzaglia & Jay Means). *Southern Illinois Fellowships for Teachers in Rural Schools (SIFTRS)*. *Robert Noyce Planning Grant*. **National Science Foundation**, Awarded, $**73,725***;* 2010-2011. **DUE, Award Number 1035348**

17. **Principal Investigator** (**PI**). *Math and Science Partnership*. **Illinois State Board of Education** and Regional Office of Education # 02*,* Awarded, **$44,625***;* 2008-2009.

18. **Principal Investigator (PI)-** *Mathematics and Science Partnership I*. **Illinois State Board of Education** and Regional Office of Education # 02*,* Awarded**, *$*32,769**; Summer 2007.

19. **Principal Investigator** (**PI**). *Math and Science Partnership II*. **Illinois State Board of Education** and Regional Office of Education # 02, Awarded, **$20,*000***, Spring 2008

20. **Principal Investigator (PI)-** *Math and Science Partnership II*. **Illinois State Board of Education** and Regional Office of Education # 02, Awarded, **$18,*000***, Spring 2007

21. **Principal Investigator (PI).** *Mathematics and Science Partnership*. **Illinois State Board of Education** and Regional Office of Education # 02, Awarded, **$35,000***;* Fall 2006

22. **Principal Investigator** (**PI)** (Co-PI Trudi Volk). *Mathematics and Science Partnership*. **Illinois State Board of Education** and Regional Office of Education # 25, Awarded ***$*15,740**, summer 2006.

Internal Funding ($ 122,115)

23. **Co-PI** (PI - Andrew Cox & Co-PI Josephine Rodriquez). Developing K-6 Science Teachers' Pedagogical Knowledge for Virtual Instruction in a COVID-19 Era and Measuring Its Impact on Student Learning. **The 3Cavaliers program; University of Virginia**; **$60,000;** 2021-2023.

24. **Co-PI** (PI- Priscilla Bame & Co-PI Josephine Rodriquez). Paving the Pathway to Appalachian Prosperity with Education Initiatives: Strengthening Existing Collaborations to Improve STEM Education and Learning. **Appalachian Prosperity Project (APP) Fellowship**; **$5,000**; 2019-2020.

25. **Principal Investigator (PI)-** Professional Development. Vice President for Research Office; **University of Virginia**; $**1,000**; 2018

26. **Principal Investigator (PI)-** Teacher pedagogical content Knowledge Research. Dean's Office, School of Education and Human Services; **University of Virginia**; **$5,000**; 2018.

27. **Principal Investigator (PI**) (Co-PIs-Ryoo Ji Hoon, Michael Kennedy, Jennie Chiu & Vivien Chabalengula). *Curry Global Engagement: Partnership for Research and Teacher Training in South Africa and Zambia*. **Curry Investment Support Program**; **$5,000**; 2017-2020.

28. **Co-PI** (PI- Chabalengula, Vivien, & Co-PIs-Jennie Chiu, & Ji Hoon Ryoo). *Development and Validation of Engineering Design Integrated Science Classroom Observation Protocol*. **School of Education and Human Development, IDEA Research Program, $10,000**, 2017-2018.

29. **Co-PI** (PI-Vivien Chabalengula). Developing and Evaluating an Instructional Model for Integrating Science and Engineering in K-12 Science Classrooms. **School of Education and Human Development, IDEA Research Program**, **$10,000**, 2014-2015.

30. **Co-PI** (PI- Michael Kennedy, & Co-PI Vivien Chabalengula). Project Stock Up on STEM: Creating Evidence- and Multimedia-Based Materials to Improve Science-Related Vocabulary Outcomes for Students with Disabilities. Curry School IDEA Research Program, **$10,000**, 2014-2015.

31. **Principal Investigator (PI**). *An Investigation of Pre-service Teachers' Attitude towards Graphs*. Dean's Office, College of Education and Human Services, SIUC*,* Awarded **$1,115***,* summer, 2009*.*

32. **Principal Investigator (PI).** *An Investigation of Instructional Practices of High School Teachers for Inclusive Science Classrooms.* Faculty Seed Grant. Office of Research Development and Administration (ORDA), Southern Illinois University Carbondale. Awarded **$15,000***,* 2006-2007

<u>Grant -related Technical reports</u>

*Note: I have served as an external evaluator for these NSF projects. For each project, I have been responsible for collecting and analyzing data, and writing annual and final evaluation reports***.**

1. **Mumba, F.** (2025). Annual report for SCI-LSAMP. University of Illinois Urbana-Campaign. The Grainger College of Engineering; Funded by National Science Foundation**, $3,500,000**; 2024-2029.
2. **Mumba, F.** (2024). Technical report for BCSER: Characterizing How Teachers Design Engaging Learning Environments in STEM Education: Examining Teachers' and Students; Conceptualizations of integrated STEM. Purdue University, National Science Foundation – Build Capacity in STEM Education Research. Amount: **$325 009**; 2021-2024
3. **Mumba, F.** (2025). Technical report for S-STEM Scholarship project. University of Virginia, College of Wise. Funded by the National Science Foundation**, $1,200,000**; 2018-2022.
4. **Mumba, F.** (2018). Technical report Pathways for STEM Leadership Project. Southern Illinois University Carbondale, Funded by National Science Foundation**, $1,000,000**; 2016-2017.
5. **Mumba, F.** (2021). Technical report for Noyce Scholarship program. Illinois State University. Funded by National Science Foundation, **$1,200,000**; 2015-2021.
6. **Mumba, F.** (2014). Technical report Computer Science/Information Systems (CS/IS) Scholarship Program. Illinois State University. Funded by National Science Foundation, **$600,000**; 2010-2014.
7. **Mumba, F.** (2005). Technical report National Science Foundation GK-12 PRISM Project. Illinois State University, Departments of Chemistry & Biological Sciences, Funded by National Science Foundation, **$2,000,000**; 2001-2005.

8. **Mumba, F.** & Chabalengula, V.M. (2008). Technical report for ISU Math and Science Partnership Project. Funded by Illinois State Board of Education, **$1,000,000**; 2005-2008.

CONFERENCE PRESENTATIONS

*Note: *denote current or former student. In science education, there are conferences for academics – science educators and researchers (where research papers are presented) and conferences for practitioners – science teacher educators and teachers. Proposals for both kinds of conferences are peer-reviewed*.

National conference presentations (N=222)

1. *Ojeogwu, J. & Mumba, F. & (2025). *Analyzing science pre-service teacher preparation through engineering design: A Literature Review*. Paper presented at the Noyce Summit. July 14-16, 2025, Washington, DC

2. *Ojeogwu, J. & Mumba, F. & (2025). *Innovating Science Education: The Impact of Situated Learning on Preservice Teachers' Implementation of Engineering Design.* Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference. March 23-26, 2025, Washington DC.

3. Mumba, F. (2025). *Promoting Education for Sustainable Development through Integration of Indigenous Knowledge into science Teacher Education*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference. March 23-26, 2025, Washington DC.

4. *Ojeogwu, J. & Mumba, F. & (2025). *Evaluating the Impact of Situated Learning Framework on EDIS Lesson Quality Among Secondary Science PSTs*. Paper presented at the Association for Science Teachers Education (ASTE), January15-18, 2025, Long Beach, CA.

5. *Rutt, A., Mumba, F., Chabalengula, V., Bailey, R., & Chiu, J. (2023). *Integrating Engineering Design into Science Teacher Education Program*. Paper presented at the Noyce Summit, June 26-28 at the Renaissance Hotel, Washington, DC.

6. Mumba, F., Chiu, J., Bailey, R., *Rutt, A., Chabalengula, V., *Ojeogwu,J. & *Pottmeyer, L. (2023). *Templates for Creating Engineering Design Integrated Science Lessons, Units and Activities.* Paper presented at the Southeast Noyce (SENOYCE); May 30-June 3, 2023. Conference, Mobile, AL.

7. *Ojeogwu, J., Rodriguez, J., Mumba, F. & Cox, A. (2023). *Developing Elementary Teachers' Virtual Science Instruction.* Paper presented at the Society for Information Technology & Teacher Education International Conference *(pp. 1766-1775*). March 13-17, New Orleans, LA, USA.

8. *Ojeogwu, J., Rodriguez, J., Mumba, F., Cox, A. (2023). *Virtual Science Instruction Resources for Teachers.* Paper presented at the National Science Teaching Association (NSTA). National Conference. March 22-25, Atlanta, GA, USA.

9. *Ojeogwu, J., & Mumba, F. (2023). *Middle and high school pre-service science teachers' engineering design self-Efficacy*. Paper Presentation at the National Association for Research in Science Teaching (NARST) Annual Conference. April 28, Virtual Presentation, USA.

10. *Ojeogwu, J., & Mumba, F. (2023). *Linear growth model analysis of pre-service science teachers' self-Efficacy*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference. April 28, Virtual Presentation, USA.

11. *Ojeogwu, J., & Mumba, F. (2022). *Preservice Science teachers' engineering design self-efficacy*. Paper presented at the Southeastern Regional Robert Noyce Conference. Montgomery, June 15-18, AL, USA.

12. *Ojeogwu, J. & Mumba, F. (2022). *Beliefs About Inquiry and Science Teaching Self-efficacy of GTAs After Inquiry Methods Course*. Paper presented at the Association for Science Teachers Education (ASTE), Greenville, SC, January 5-8, 2022.

13. Mumba, F. & *Ojeogwu, J. (2022). *Graduate Teaching Assistants' conceptions of science teaching and self-efficacy for inquiry.* Paper presented at the Association for Science Teachers Education (ASTE), Greenville, SC, January 5-8, 2022.

14. *Rutt, A. & Mumba, F. (2021). *Pre-service teachers' language-and literacy-integrated science instruction through a cultural historical activity theory lens*. Paper presented at the American Educational Research Association Annual International Conference, virtual, April 2021.

15. *Rutt, A. & Mumba, F. (2021). *Secondary science preservice teachers' enactment of language- and literacy-integrated science instruction in linguistically diverse* classrooms. Paper presented at the National Association for Research in Science Teaching Conference, virtual, April 2021.

16. *Rutt, A. & Mumba, F. (2021). *Secondary science PSTs' instructional planning for language- and literacy-integrated science*. Paper presented at the Association for Science Teacher Education Conference, Salt Lake City, UT, January 2021.

17. *Pottmeyer, L. & Mumba, F. (2020). *Impact of Engineering Design Integrated Science Instruction on Student learning outcomes*. National Association for Research in Science Teaching (NARST) Conference, March 15-18, 2020; Portland, OR.
18. *Rutt, A. & Mumba, F. (2019). *Preparing pre-service science teachers to teach science in linguistically diverse classrooms*. Presented at the 2019 Noyce Summit, Washington, D.C., June, 2019.

19. Mumba, F., Ochs, L., & *Rutt, A. (2019). *Developing Pre-Service Science Teachers' Understanding of the Engineering Design Process and the Scientific Method*. Paper presented at the National Association of Research in Science Teaching (NARST) Annual International Conference. Baltimore, MD, USA. March 31 - April 3, 2019.

20. Mumba, F. Rollnick, M., Toerien, R, (2019). *PCK for Teaching Chemical Bonding of TAs Compared to Teachers*. Paper presented at the National Association of Research in Science Teaching (NARST) Annual International Conference. Baltimore, MD, USA. March 31 - April 3, 2019.

21. Chabalengula, V.M. & Mumba, F. (2019). *Science and Engineering Practices Coverage in Zambia's Integrated Science Curriculum*. Paper presented at the National Association of Research in Science Teaching (NARST) Annual International Conference. Baltimore, MD, USA. March 31 - April 3, 2019.

22. Mumba, F. & *Rutt, A. (2019). *Developing Preservice Teachers' Content and Pedagogical Content Knowledge for the History of Science Integrated Science Instruction*. Paper presented at the Association of Science Teacher Education (ASTE) Conference, Savannah, Georgia, GA, January 3-5, 2019.

23. *Rutt, A., Mumba, F. & Kibler, A. (2019). *Preparing Preservice Teachers to Teach Science to English Learners: A Review of Literature*. Paper presented at the Association of Science Teacher Education (ASTE) Conference, Savannah, Georgia, GA, January 3-5, 2019.

24. *Sankaranarayanan, V., *Gamboa, C., & Mumba, F. (2018). *Project-Based Science Instruction in K-12 Classrooms*. Presentation at the Virginia Association for Science Teachers' Annual Conference, Williamsburg, VA, Nov 16-17, 2018.

25. *Desmarais, A., *Winesett, T. & Mumba, F. (2018). *Problem-Based Learning Activities*. Presentation at the Virginia Association for Science Teachers' Annual Conference, Williamsburg, VA, Nov 16-17, 2018.

26. *Squires, W., *Dostart, A. & Mumba, F. (2018). *Engineering Design Integrated Science Activities*. Presentation at the Virginia Association for Science Teachers' Annual Conference, Williamsburg, VA, Nov 16-17, 2018.

27. *Shelton, S. & *Smith, S. & Mumba, F. (2018). *Three Ways to Integrate History of Science in Science Teaching*. Presentation at the Virginia Association for Science Teachers' Annual Conference, Williamsburg, VA, Nov 16-17, 2018.

28. *Guo, Z., *Sackson, J. & Mumba, F. (2018). *Case-Based Learning Activities for Science Classrooms*. Presentation at the Virginia Association for Science Teachers' Annual Conference, Williamsburg, VA, Nov 16-17, 2018.

29. Mumba, F., Toerien, R., & Rollnick, M. (2018). *Chemistry teachers' and teaching assistants' explanatory frameworks for chemical bonding in relation to their PCK*. Paper presented at the National Association for Research in Science Teaching, Atlanta, Georgia, March 10 - 13, 2018

30. *Rutt, A., Mumba, F., Ochs, L. Chabalengula, V. (2018). *Chemistry Teaching Assistants' Beliefs about Project-Based Guided Inquiry Instruction*. Paper presented the National Association for Research in Science Teaching, Atlanta, Georgia; March 10 - 13, 2018.

31. Gougis, R., Mumba, F. Hunter, W. & Lorsbach, A. (2018). *Relationship between Prospective Noyce Preservice Teachers' Conceptions of Science Teaching and Self-efficacy for Inquiry Science Teaching After Intervention*. A paper presented at the National Association for Research in Science Teaching, Atlanta, Georgia, March 10 - 13, 2018.

32. *Ochs, L. Mumba, F. & Chiu, J. (2018). *Pre-Service Teachers' Identification of NGSS Engineering and Science Practices in a Sample Lesson Plan*. Paper presented at the Association of Science Teacher Education (ASTE) Conference, Baltimore, MD, January 3-6, 2018.

33. *Rutt, A. & Mumba, F. (2018). *Middle School Science Teachers' Pedagogical Orientations Towards Inquiry Instruction*. Paper presented at the Association of Science Teacher Education (ASTE) Conference, Baltimore, MD, January 3-6, 2018.

34. Mumba, F. & *Ochs, L. (2018). *A model for determining the nature and extent of integration in Engineering Design and Science Integrated Activities*. Paper presented at the Association of Science Teacher Education (ASTE) Conference, Baltimore, MD, January 3-6, 2018.

35. *McIntosh, S., *Rice, M., *Jansch, C. & Mumba, F. (2017). *UVa Engineering Design Teacher Guide Manuals & Activities*. Presentation at the Virginia Association for Science Teachers' Annual Conference, Roanoke, VA, Nov 16-18, 2017.

36. *Deuel, M., *Lauren, T., *Maloney, R. & Mumba, F. (2017). *Use Storyline to Teach History of Science Integrated Lessons*. Presentation at the Virginia Association for Science Teachers' Annual Conference, Roanoke, VA, Nov 16-18, 2017.

37. *Lauren, T., *Gallagher, A., *Deuel M. & Mumba, F. (2017). *Using Case-Based Learning in K-12 Science*. Presentation at the Virginia Association for Science Teachers' Annual Conference, Roanoke, VA, Nov 16-18, 2017.

38. *Henson, H., *Subramanian, R. & Mumba, F. (2017). *Earthquake Hazard Education to Middle School Students near the New Madrid Seismic Zone*. *Geological Society of America Abstracts with Programs* Vol. 49, No. 6, presented at the GSA Annual Meeting in Seattle, WA, October 22-26, 2017. doi: 10.1130/abs/2017AM-304660

39. Gougis, R., Mumba, F., *Baldwin, K., Hunter, W. & Lorsbach, A. (2017). *Prospective Noyce Teacher Candidates' Pedagogical Orientations towards Inquiry Science Teaching*. Paper presented at the National Association for Research in Science Teaching, San Antonio, Texas; April 22-25, 2017.

40. *Neitzer, L., Chabalengula, V, & Mumba, F. (2017). *Intersection between Global and Self-reported Community-based Environmental Concerns*. Paper presented at the National Association for Research in Science Teaching, San Antonio, Texas; April 22-25, 2017.

41. *Ochs, L. & Mumba, F. (2017). *Pre-Service Teachers' Perceptions of Engineering and Familiarity with Teaching Design, Engineering, and Technology*. Paper presented at the National Association for Research in Science Teaching, San Antonio, Texas; April 22-25, 2017.

42. *Ochs, L. & Mumba, F. (2017). *Development and Validation of an Instrument for Assessing Students' Attitudes Towards Graphing*. Paper presented at the National Association for Research in Science Teaching, San Antonio, Texas; April 22-25, 2017.

43. *Rutt, A., Mumba, F., Chabalengula, V. & Ochs, L. (2017). *Middle School Science Teachers' Technology Decision for Inclusive Science Classrooms*. Paper presented at the National Association for Research in Science Teaching, San Antonio, Texas; April 22-25, 2017.

44. *Chitiyo, J., Chabalengula, V. & Mumba, F. (2017). *Pre-service Teachers' Attitudes Toward Biotechnology Applications*. Paper presented at the National Association for Research in Science Teaching, San Antonio, Texas; April 22-25, 2017.

45. *Ochs, L., Mumba, F. & Chiu, J. (2017). *Pre-service Teachers' Perceptions of Engineering and Familiarity with Teaching Design, Engineering, and Technology*. Paper presented at the National Association for Research in Science Teaching, San Antonio, Texas; April 22-25, 2017.

46. *Ochs, L., Mumba, F. Chiu, J. & Rutt, A. (2017). *Pre-Service Teachers' Self-Efficacy of Teaching Engineering in Science Classrooms.* Paper presented at the Association of Science Teacher Education (ASTE) Conference , Des Moines, Iowa, January 12-14, 2017.

47. Chabalengula, V., *Bendjemil, S., Mumba, F. & Chiu, J. (2017). *Status of Science and Engineering Practices in K-12 Science Curriculum Materials.* Paper presented at the Association of Science Teacher Education (ASTE) Conference , Des Moines, Iowa, January 12-14, 2017.

48. Mumba, F., *Lindemann, C., *Manning, A. & *Michaels, K. (2016). *Using Case-Based Learning in Science Classrooms*. Presentation at the Virginia Association for Science Teachers' Annual Conference, Williamsburg, Nov 17-19, 2016.

49. Mumba, F., *Davis, J., *Ray, K. & *DiOrio, J. (2016). *Problem-Based Learning Template, Units and Activities*. Presentation at the Virginia Association for Science Teachers' Annual Conference, Williamsburg, Nov 17-19, 2016.

50. *Iuga, A., *Weng, S., *Alyse-Nelson, S. & Mumba, F. (2016). *Engineering Integrated Science Units and Teacher Manuals*. Presentation at the Virginia Association for Science Teachers' Annual Conference, Williamsburg, Nov 17-19, 2016.

51. *Banda, A, & Mumba, F. (2016). *Zambian Pre-Service Junior High School Science Teachers' Chemical Ability.* Presentation at the 2nd National Symposium on Chemistry, Materials and Energy, Lusaka, Zambia, Nov 10 – 11 November 2016.

52. Mumba, F., *Baldwin, K., & Gougis, R.D. (2016). *Noyce Teacher Candidates: Initial Pedagogical Orientations Towards Science Teaching*. Noyce Summit. Stimulating Research and Innovation for Preservice Education of STEM teachers in High-Need Schools. American Association for the Advancement of Science (AAAS). Washington DC. July 20-22, 2016.

53. Chabalengula, V.M., & Mumba, F. (2016). *Energy Conservation in Biological Contexts: Intersection Between Scientific and Everyday Language Usage.* Presentation at the National Association of Research in Science Teaching (NARST) Conference. Baltimore, MD, USA. April 14 - 17, 2016.

54. *Ochs, L., Mumba, F. & Chabalengula, V. M. (2016). *Technology Teachers' Use in Inclusive Chemistry Classrooms and Factors that influence the Selection of such Technology.* Presentation at the National Association of Research in Science Teaching (NARST) Conference. Baltimore, MD, USA. April 14 - 17, 2016.

55. *Chitiyo, J., Chabalengula, V.M., & Mumba, F. (2016). (2016). *Understanding of Biotechnology Processes Among Pre-Service Science Teachers*. Presentation at the National Association of Research in Science Teaching (NARST) Conference. Baltimore, MD, USA. April 14 - 17, 2016

56. Dershimer, C., Frank, C., Mumba, F., Chiu, J., Alexander, A., Goodale, T. & Schnittka, C. (2016). *Symposium - A Design Charrette to Explore Models for Engaging Science Preservice Teachers in Engineering.* National Association of Research in Science Teaching (NARST) Annual International Conference. Baltimore, MD, USA. April 14 - 17, 2016

57. Mumba, F., *Blankenship, S., Hunter, W. & Carver, J. (2016). *Inquiry Representation in the Journal of Chemical Education*. Paper presented at the 251st ACS National Meeting & Exposition. San Diego, CA, March 13-17, 2016

58. *Ochs. L., & Mumba, F (2016). *Analysis of Inquiry Practices in The American Biology Teacher.* Paper presented at the Association of Science Teacher Education Conference, Reno, NV, Jan. 7-9, 2016.

59. Mumba, F., *Ochs, L. & Chabalengula, V.M. (2016). *Chemistry Teachers' Technology Decisions for Inclusive Chemistry Classrooms*. Paper presented at the Association of Science Teacher Education Conference, Reno, NV, Jan. 7-9, 2016.

60. *Jones, N. & Mumba, F. (2015). *Teachers' Familiarity with, Interest in and Conceptual Knowledge of Microbiology Concepts*. National Association of Research in Science Teaching (NARST) Annual International Conference. Chicago, IL, USA. March 30 - April 2, 2015.

61. *Bendjemil, S. A., Chabalengula. V.M. & Mumba, F. (2015). *Science & Engineering Practices Coverage in K-12 Engineering Curricula*. National Association of Research in Science Teaching (NARST) Annual International Conference. Chicago, IL, USA. March 30 - April 2, 2015.

62. Chabalengula. V.M. & Mumba, F. & *Bendjemil, S. A. (2015). *Engineering Design Process Skills Coverage in K-12 Science Curricula*. National Association of Research in Science Teaching (NARST) Annual International Conference. Chicago, IL, USA. March 30 - April 2, 2015.

63. Mumba, F., *Banda, A., Chabalengula, V.M. & *Dolenc, N. (2015). *Chemistry Teachers' Perceived Benefits and Challenges of Inquiry-based Instruction in Inclusive Chemistry Classrooms*. Paper presented at the Association of Science Teacher Education International Conference, Portland, OR, Jan. 7-10, 2015.

64. *Dolenc, N, Mumba, F. & Chabalengula, V.M (2015). *Assessing High School Science Teachers' Conceptions of Inquiry through Scenarios and Lesson Narratives*. Paper presented at the Association of Science Teacher Education International Conference, Portland, OR, Jan. 7-10, 2015.

65. *Banda, A., Mumba, F. & Chabalengula, V.M. (2015). *Using Scenarios to Assess Pre-service Science Teachers' Pedagogical Strategies for addressing Students' Misconceptions on Electrolysis*. Paper presented at the Association of Science Teacher Education International Conference, Portland, OR, Jan 7-10, 2015.

66. Chabalengula, V. M,. Mumba, F. & *Fateen, R (2015). *Engaging Pre-Service Science Teachers in Learning and Teaching of Homeostasis using Computer Simulation*. Paper presented at the Association of Science Teacher Education International Conference, Portland, OR, Jan 7-10, 2015.

67. *Banda, A., Mumba, F., & *Mbewe, S., *Nyirenda E. (2014). *Pre-service teachers' thinking about science.* Paper presented at the UNZA-Hiroshima Research Dissemination Seminar, Lusaka, Zambia, August 19, 2014.

68. Mumba, F. & Chabalengula, V.M. (2014). *Impact of Scientific modeling on Pre-Service Teachers' knowledge Generation*. Paper presented at the National Association of Research in Science Teaching (NARST) Annual International Conference. Pittsburgh, PA, USA. March 30 - April 2, 2014).

69. Chabalengula, V.M., Mumba, F. & *Fateen, R. (2014). *Interactive Computer Simulation on Biology Teachers' Understanding of Homeostasis Concepts*. Paper presented at the National Association of Research in Science Teaching (NARST) Annual International Conference. Pittsburgh, PA, USA. March 30 - April 2, 2014.

70. Mumba, F., & Chabalengula, V. M. (2014). *Examining Pre-service Teachers' Conceptions of Inquiry using Teaching Scenarios*. Paper presented at the National Association of Research in Science Teaching (NARST) Annual International Conference, Pittsburgh, PA, USA. March 30 - April 2, 2014).

71. *Al Sultan, A., Chabalengula, V. M. & Mumba, F. (2014). *Pre-service Teachers' Scientific Literacy Level*. Paper presented at the National Association of Research in Science Teaching (NARST) Annual International Conference, Pittsburgh, PA, USA. March 30 - April 2, 2014).

72. *Al Sultan, A., Chabalengula, V.M. & Mumba, F. (2014). *Attitudes towards science and science teaching among pre-service teachers*. Paper presented at the Association of Teacher Educators (ATE) annual conference. St. Louis, Missouri, USA. February 15-18, 2014.

73. *Ataallh A., Chabalengula, V.M., & Mumba, F. (2014). *Pre-service teachers' attitudes, understanding and teaching confidence towards science*. Paper presented at the Association of Teacher Educators (ATE) annual conference. St. Louis, Missouri, USA. February 15-18, 2014.

74. *Banda, A., Mumba, F. & Chabalengula, V.M. (2014). *Secondary School Pupils' Familiarity, Interest and Conceptual Understanding of Chemistry Concepts*. Paper presented at the Association of Teacher Educators (ATE) annual conference. St. Louis, Missouri, USA. February 15-18, 2014.

75. *Kalonde, G., Chabalengula, V.M. & Mumba, F. (2014). *Pre-Service teachers' Attitudes, Perceptions and Usage of Technology Mediated Science Instruction.* Paper presented at the Association of Teacher Educators (ATE) annual conference. St. Louis, Missouri, USA. February 15-18, 2014.

76. *Al Sultan, A., Chabalengula, V.M., & Mumba, F. (2014). *Pre-service teachers' personal and professional attitudes towards science.* Paper presented at the Association of Science Teacher Educators (ASTE) International Conference. San Antonio, Texas, USA. January 16-18, 2014.

77. *Ataallh A., Chabalengula, V.M. & Mumba, F. (2014). *Effects of science methods course level on pre-service teachers' science attitudes, understanding and teaching confidence.* Paper presented at the Association of Science Teacher Educators (ASTE) International Conference. San Antonio, Texas, USA. January 16-18, 2014.

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79. *Henson, H., Mumba, F., Renzgalia, K., Bu, L., & Wright, M. (2013). *Southern Illinois Community of Problem-Solving Project: Impacts on Teachers' Content Knowledge, Research and Pedagogical Skills*. A poster presented at the National Science Foundation (NSF) Robert Noyce Teachers Scholarship Program Conference, Washington D.C, USA, May 29-31, 2013.

80. *Midden, C., & Mumba, F. (2013*). Using Action Research to Measure the Impact of Problem-Based Learning on Students' Content Knowledge, Skills, and Attitude towards Light Pollution*. A poster presented at the National Science Foundation (NSF) Robert Noyce Teachers Scholarship Program Conference, Washington D.C, USA, May 29-31, 2013.

81. Mumba, F., *Mbewe, S., & Chabalengula, V.M. (2013). *Elementary Education Pre-service Teachers' Performance on Context-based Science Process Skills*. Paper presented at the National Association of Research in Science Teaching (NARST) Annual International Conference, Rio Grande, Puerto Rico, USA. April 6 - 9, 2013.

82. Bu, L., Mumba, F., & Wright, M. (2013). *Teach mathematical modeling with GeoGebra*. A paper presented at the 2013 Conference of National Council of Teachers of Mathematics (NCTM), Denver, CO. April, 2013.

83. Bu, L., Mumba, F., Wright, M., & *Henson, H. (2013). *Math and Science Teachers' Experiences of Online Professional Development*. A paper presented at the 2013 annual conference of the Association of Teacher Educators, Atlanta, GA, February 16-19, 2013.

84. *Banda, A., Mumba, F., Chabalengula, V.M. & *Mbewe, S. (2013). *Zambian Pre-Service High School Teachers' Knowledge about the Particulate Nature of Matter*. A paper presented at the Association of Science Teacher Education, Charleston, SC. Jan 9-12, 2013.

85. Mumba, F., *Banda, A., *Mbewe, S. & Chabalengula, V.M. (2012). *Zambian High School Pre-Service Science Teachers' Attitudes Toward Biotechnology Processes*. A paper presented at the Association of Science Teacher Education, Charleston, SC. Jan 9-12, 2013.

86. Mumba, F., & *Banda, A. (2012). *In-service high school chemistry teachers' perceived benefits and challenges of inquiry in inclusive chemistry classrooms*. Paper presented at the Americal Chemical Society (ACS) Midwest Regional Meeting, Omaha, NE, October 24 – 27, 2012.

87. *Banda, A., & Mumba, F., (2012). *Pre-service chemistry teachers' perceptions of goals of chemistry education and the challenges for achieving them*. Paper presented ACS Midwest Regional Meeting, Omaha, NE, October 24 – 27, 2012.

88. Bu, L., *Henson, H., Renzaglia, K., Mumba, F., Wright, M., & Janasie,J. (2012). *Toward a Community of Problem Solvers: SRET and Noyce Master Teacher Fellowship in Southern Illinois*. Poster presented at the 2012 Noyce Midwest Regional Conference, Indianapolis, IN, October 4-5, 2012.

89. Mumba, F., *Banda, A. & Chabalengula, V.M. (2012). *Students' views of chemistry as a science and of chemistry studies in their classes*. A paper presented at the 244th American Chemical Society National Meeting & Exposition, Philadelphia, PA, August 19-23, 2012.

90. *Banda, A. & Mumba, F. (2012). *Teachers' abilities to identify misconceptions on electrolysis.* A paper presented at the 244th American Chemical Society National Meeting & Exposition, Philadelphia, PA, August 19-23, 2012.

91. *Banda, A. & Mumba, F. (2012). *Zambian Pre-service Science Teachers' Interest in and Conceptual Understanding of Electrochemistry Concepts*. A paper presented at the 244th American Chemical Society National Meeting & Exposition, Philadelphia, PA, August 19-23, 2012.

92. Gary, K., Mumba, F. & *Wong, V.N. (2012). *Evaluation of Computer-based Structured Learning Workshops: Successes, challenges and Implications for General Chemistry Instruction.* A paper presented at the Biennial Chemical Education Conference (BCCE), Penn State University, PA, July 29-Aug 2, 2012.

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94. *Banda, A. & Mumba, F. (2012). *What do Pre-service Teachers View as Important Outcomes of Chemistry Education?* A paper presented at the Biennial Chemical Education Conference (BCCE), Penn State University, State Park, PA, July 29-Aug 2, 2012.

95. *Banda, A. & Mumba, F. (2012). *Pre-service Teachers' Pedagogical Ideas for Electrochemistry.* A paper presented at the Biennial Chemical Education Conference (BCCE), Penn State University, State Park, PA, July 29-Aug 2, 2012.

96. Mumba, F., Zhu, M., Ma, J. & Ahmed, S. (2012). *New Design and Implementation of a Virtual Classroom System Using Google App Engine*. Paper presented at *Society for Information Technology & Teacher Education International Conference* 2012 (Mar 05, 2012) pp. 698–705 .

97. Zhu, M. & Mumba, F. (2012). *An Interactive Learning and Assessment System for Simulation-based Science Education Using Cloud Computing Technology*. Paper presented at the 18th International Conference on Distributed Multimedia Systems. Miami Beach, FL August 2012.

98. Bu, L., Mumba, F. & Wright, M. (2012). *Mathematics History in Video: In-Service Elementary School Teachers' Experience*. Paper presented at the 2012 Conference of National Council of Teachers of Mathematics (NCTM) Philadelphia, PA. April 2012.

99. Bu, L., Mumba, F. & Wright, M. (2012). *Solving classic problems using dynamic mathematics technology*. The 2012 Conference of National Council of Teachers of Mathematics (NCTM) Philadelphia, PA. April 2012

100. Mumba, F., *Wong, V.N. & Kinsel, G. (2012). *A comparison of Students' and Teaching Assistants' successes and Challenges in Assessment, Review and Instruction System (ARIS) program*. Paper presented at the 243rd American Chemical Society (ACS) National Meeting & Exposition, San Diego, California, March 25 –29, 2012.

101. Mumba, F. & *Banda, A. (2012), A. *Effect of computer simulations on Elementary and middle school science teachers' understanding of Chemical equilibrium*. Paper presented at the 243rd American Chemical Society (ACS) National Meeting & Exposition, San Diego, California, March 25 – 29, 2012.

102. Mumba, F., *Miles, E., & Chabalengula, V.M. (2012). *Elementary education teachers' interest in and conceptual knowledge of science process skills.* Paper presented at National Association for Research in Science Teaching National Meeting. Indianapolis, IN, March 2012.

103. Chabalengula, V.M., & Mumba, F. (2012). *Model-based inquiry instruction: Promoting knowledge generation in biology.* Paper presented at the National Association for Research in Science Teaching National Meeting. Indianapolis, IN, March 2012.

104. Zhu, M. & Mumba, F. (2012). *New Design and Implementation of a Virtual Classroom System Using Google App Engine*. Paper presented at the Society for Information Technology and Teacher Education (SITE) Conference, Austin, Texas USA, March 5-9, 2012.

105. Bu, L., & Mumba, F. (2012). *Online Professional Development for Elementary Mathematics: A Design Framework.* Paper presented at the Association of Teacher Education (ASTE) Winter meeting, San Antonio, TX, February 11-15, 2012.

106. *Tucker, M., *Miles, E. & Mumba, F. (2012). *Examining the Influence of MSP on Teachers' Science Teaching and Learning Beliefs*. Paper presented at Regional Mathematics and Science Partnership (MSP) Conference, New Orleans, LA, Jan 30-Feb 1, 2012.

107. *Miles, E., Mumba, F. & Bu, L. (2012). *Action Research as a Framework for Measuring Teachers' and Students' Achievement in MSP Projects*. Paper presented at Regional Mathematics and Science Partnership (MSP) Conference, New Orleans, LA, Jan 30-Feb 1, 2012.

108. *Miles, E., Mumba, F., Chabalengula, V.M. & Wise, K. (2012). *In-Service Elementary Teachers' Familiarity and Interest in the Science Process Skills.* Paper presented at the Association of Science Teacher Education International Conference, Clearwater, FL, Jan 4-7, 2012.

109. *Banda, A. & Mumba, F. (2012). *The Power of the Fruit: Introducing Basic Electrochemistry Concepts.* Presented at Science in the South conference, SIUC, Carbondale, IL, January 2012.

110. *Wong, V.N., *Priyasantha, K.K., Kinsel, G. & Mumba, F. (2011). *Impact of computer-based Structured Learning Workshop on Graduate Teaching Assistants' Specific Chemistry Content*. Paper presented at the 46th Midwest and 39th Great Lakes Joint Regional Meeting of the American Chemical Society, St. Louis, MO, October ,19-22, 2011.

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112. *Banda, A., Mumba, F., *Mbewe, S., & Chabalengula, V.M. (2011). *Zambian pre-service science teachers' ranking of chemistry education goals.* Paper presented at the 46th Midwest and 39th Great Lakes Joint Regional Meeting of the American Chemical Society, St. Louis, MO, October 19-22, 2011.

113. Mumba, F. (2011). *Teaching Chemistry in Inclusive classes: Implication for Chemistry Teacher Education.* Paper presented at the 46th Midwest and 39th Great Lakes Joint Regional Meeting of the American Chemical Society, St. Louis, MO, October 19-22, 2011.

114. Mumba, F., Chabalengula, V.M., *Banda, A., & *Mbewe, S. (2011). *High School Students' Attitude towards Chemistry as Science and Chemistry Studies*. Paper presented at the 46th Midwest and 39th Great Lakes Joint Regional Meeting of the American Chemical Society, St. Louis, MO, October 19-22, 2011.

115. Mumba, F., *Hudson, G., & Wang, L. (2011). *Identifying Undergraduate Students' Mathematical skills, reasoning and speed for chemical kinetics*. Paper presented at 242nd American Chemical Society National Meeting. Denver, CO. Aug. 28 – Sept. 1, 2011.

116. *Hudson, G., Mumba, F., & Wang, L. (2011). *Assessing physical chemistry undergraduate students' interpretation of chemical kinetics equations*. Paper presented at 242nd American Chemical Society National Meeting. Denver, CO. Aug. 28 – Sept. 1, 2011.

117. Mumba, F., *Banda, A., Chabalengula, V.M., *Mbewe, S., & Hunter, W. (2011). *Comparison between Zambian male and female pre-service teachers understanding of the particulate nature of matter*. Paper presented at 242nd American Chemical Society National Meeting. Denver, CO. Aug. 28 – Sept. 1, 2011.

118. Kinsel, G., Mumba, F., & *Wong. V. N. (2011). *Impact of technology-based chemistry structured learning workshops on Teaching Assistants' pedagogical content knowledge & technology skills.* Paper presented at 242nd American Chemical Society National Meeting. Denver, CO. Aug. 28 – Sept. 1, 2011.

119. *Mbewe, S., Chabalengula, V.M., Mumba, F., *Henson, H., Bu, L., & Wright, M. (2011). *Pre-service K-8 Science Teachers' Conceptual understanding of Science Process Skills.* Paper presented at the summer 2011 Association of Teacher Educators Conference, Philadelphia, PA August 5-9, 2011.

120. Chabalengula, V.M., Mumba, F., *Henson, H., Bu, L., & Wright, M. (2011). *In-service Teachers' Perceived Benefits and Difficulties of Inquiry*. Paper presented at the summer 2011 Association of Teacher Educators Conference, Philadelphia, PA August 5-9, 2011.

121. Mumba, F., Chabalengula, V.M., *Henson, H., Bu, L., & Wright, M. (2011). *Elementary Education In-service Teachers' Inquiry Instructional Practice*. Paper presented at the summer 2011 Association of Teacher Educators Conference, Philadelphia, PA August 5-9, 2011.

122. Bu, L., Mumba, F., & Wright, M. (2011). *Impact of Model-Centered Learning on Teachers' Attitudes toward Mathematics Teaching*. Paper presented at the National Council of Teachers of Mathematics (NCTM) 2011 meeting, Indianapolis, IN, April 11-13, 2011.

123. Mumba, F., Bu, L., & Wright, M. (2011). *Solving problems using GeoGebra: Classroom Teachers' Experience.* Paper presented at the National Council of Teachers of Mathematics (NCTM) 2011 meeting, Indianapolis, IN, April 11-13, 2011.

124. *Fisher, C., Chabalengula, V.M., & Mumba, F. (2011). *Attitudes towards Science and Technology among General Education Development students*. Paper presented at the National Association of Research in Science Teaching (NARST) 2011 Meeting, Orlando, FL.

125. Chabalengula, V.M., Mumba, F., & *Chitiyo, J. (2011). *Pre-service Teachers' Understanding of Biotechnology Processes.* Paper presented at the National Association of Research in Science Teaching (NARST) 2011 Meeting, Orlando, FL.

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128. *Banda, A., Mumba, F., & Chabalengula, V.M. (2011). *Zambian pre-service science teachers' understanding of the particulate nature of matter*. Paper presented at the 241st American Chemical Society National Meeting, Anaheim, CA, March 27-31, 2011.

129. *Mbewe, S., & Mumba, F. (2011). *Innovative way of teaching and learning about energy*. Paper presented at Closing the Gap: Practical strategies for all Educators conference, John Logan College, Carterville, IL, March 25, 2011

130. *Banda, A., & Mumba, F. (2011). *The SMART and EXPLICIT approach for integrating math and science.* Paper presented at Closing the Gap: Practical strategies for all Educators conference, John Logan College, Carterville, IL, March 25, 2011

131. *Tucker, M., & Mumba, F. (2011). *MSP teachers' knowledge about Science Process Skills.* Paper presented at Mathematics and Science Partnership Conference, San Francisco, CA. March 21-23, 2011.

132. *Miles, E., Mumba, F., & *Tucker, M. (2011). *In-service teachers' beliefs about mathematics teaching and learning.* Paper presented at Mathematics and Science Partnership Conference, San Francisco, CA. March 21-23, 2011

133. Mumba, F., & Zhu, M. (2011). *An Interactive Simulation based Virtual Classroom System using Cloud Computing Technology*. Paper presented at Society of Information Technology and Teacher Education (SITE) 22nd International Conference, March 7-11, 2011, Nashville, TN.

134. Chabalengula, V.M., Mumba, F., Zhu, M., *Banda, A., *Mbewe, S., & *Miles, E. (2011). *Science Teachers Familiarity of and Interest in Computer Simulations, Animations, visualization, modeling and virtual reality*. Paper presented at Society for Information Technology and Teacher Education (SITE) 22nd International Conference, March 7-11, 2011, Nashville, TN.

135. *Jones, N., & Mumba, F. (2011). *Science Teachers' Perceived and Actual Knowledge about Basic Microbiology Concepts*. Paper presented at the American Association for the Advancement of Science [AAAS] Annual Meeting, Washington DC, 17-21 February 2011.

136. *Henson, H., Mumba, F., *Hodgson, S., *Black, C., & *Heidel, D. (2011). *Understanding Earthquake Awareness among Southern Illinois School Children.* Paper presented at the Association of Teacher Educators Spring meeting, Orlando, FL, February 12-16, 2011,

137. Bu, L., Mumba, F., *Henson, H., & Wright, M. (2011). *Reflecting on the Purpose and Practice of Mathematics and Science Education Through Video-Based Historical Intervention.* Paper presented at the Association of Teacher Educators Spring meeting, Orlando, FL, February 12-16, 2011,

138. *Banda, A., Mumba, F., & Chabalengula, V.M. (2011). *Effect of Teachers' Professional Development Programs on Teachers' Conceptual knowledge about Simulations, Animations, and Visualizations*. Paper presented at Mathematics and science partnership Conference, Baltimore, MD, Feb 14-17, 2011.

139. *Mbewe, S., Mumba, F., *Henson, H., Bu, L., Chabalengula, V.M., & Wright, M. (2011). *MSP In-Service Teachers' Instructional Practice and their Perceived Benefits and Difficulties of Inquiry.* Paper presented at Mathematics and Science partnership Conference, Baltimore, MD, Feb 14-17, 2011.

140. Bu, L., Mumba, F., & *Kalonde, G. (2011). *The SMART Approach to Improving Teachers' Attitudes toward Mathematics Teaching: Model-Centered Learning and Open-Source Learning Technology*. Paper presented at Mathematics and Science Partnership Conference, Baltimore, MD, Feb 14-17, 2011.

141. Mumba, F., & *Henson, H. (2011). *Energy Concepts and Careers: Project NEWS (New Energy Workforce Systems)*. Paper presented at the Science in the South Conference, Southern Illinois University Carbondale, IL, January 28, 2011.

142. *Mbewe, S., Chabalengula, V.M., & Mumba, F. (2011). *Exploring Teachers' Familiarity, Interest and Conceptual Understanding of Science Process Skills*. Paper presented at the Association of Science Teacher Education (ASTE) 2011 meeting, Minneapolis, MN, January 19-22, 2011.

143. *Miles, E., & Mumba, F. *Science Processes Skills Activity for Integrating math and Science in K-12 classrooms (2010).* Paper presented at 31st Annual Mt. Vernon Conference, October 28-29, 2010, Mt. Vernon Township High School, Mt. Vernon, IL.

144. Bu, L., Mumba, F., Hunter, W., Wright, M., & *Henson, H. (2010). *Designing Online Professional Development for Rural In-service Mathematics and Science Teachers: The Case of Mathematical Problem Solving*. Paper presented at the Association for Educational Communications and Technology (AECT) meeting, October 26-30, 2010, Anaheim, CA

145. Mumba, F., Chabalengula, V.M., *Mbewe, S., & *Henson, H. (2010). *Teacher-Leaders' Reformed and Inquiry Science Teaching & Learning*. Paper presented at the Association of Teacher Educators Summer meeting, August 7-11, 2010, Kansas City, MO

146. *Mbewe, S., Mumba, F., Chabalengula, V.M., *Henson, H., & Wright, M. (2010). *Exploring Teacher-Leaders' Reformed Teaching through Examination of Design and Implementation*. Paper presented at the Association of Teacher Educators Summer meeting, August 7-11, 2010, Kansas City, MO

147. Bu, L., Mumba, F., Wright, M., & *Henson, H. (2010). *Integrating Dynamic Software in professional development: The initial experience of rural in-service elementary (K-8) teachers.* Paper presented at the Association of Teacher Educators Summer meeting, August 7-11, 2010, Kansas City, MO.

148. *Donatelli, J.M., Gibson, D., Renzaglia, K., *Henson, H., Mumba, F., Sipes, S.D., & Schachel, K. (2010). *Bridging the gap, building the future: STEM fellows teaching global change in primary education*. Paper presented at the 95th Ecological Society of America (ESA) Annual Meeting. August 1-6, 2010. Pittsburgh, PA.

149. Chabalengula, V.M., Mumba, F., *Miles, E., & *Mejia, W. (2010). *Pre-service elementary education teachers' attitude towards graphs.* Paper presented at the American Educational Research Association (AERA) Meeting, April 30-May 4, 2010.Denver, CO.

150. Mumba, F., Chabalengula, V.M., *Mbewe, S., & *Henson, H. (2010). *Teachers' beliefs about Reformed and Inquiry-based Science Teaching & Learning*. Paper presented at the Midwest Association of Teacher Educators (MWATE), March 26, 2010, Urbana, IL

151. *Mbewe, S., Mumba, F., Wright, M., *Henson, H., Chabalengula. V.M. (2010). *Assessing Math and Science Teachers' Reformed Teaching through Examination of Design, and Implementation*. Paper presented at the Midwest Association of Teacher Educators (MWATE) Conference, March 26, 2010, Urbana, IL, IL

152. Chabalengula, V.M., *Mbewe, S., Mumba, F., *Henson, H., & Wright, M. (2010). *Elementary and Middle School Science Teachers' Instructional Practices*. Paper presented at the Midwest Association of Teacher Educators (MWATE) Conference, March 26, 2010, Urbana, IL

153. Mumba, F., *Mejia, W.F., *Miles, E.N., Chabalengula, V.M., & Hunter, W.F.J. (2010). *Resident scientists' inquiry instructional practice and their perceived benefits and difficulties for inquiry in schools.* Paper presented at the National Association for Research in Science Teaching (NARST) Meeting, Philadelphia, PA. March 21-24, 2010

154. *Szyjka, S., Mumba, F., & Wise, K. (2010). *Cognitive and Attitudinal Predictors Related to Line Graphing Achievement among Elementary Pre-service Teachers.* Paper presented at the National Association for Research in Science Teaching, 2010 meeting, Philadelphia, PA. March 21-24, 2010

155. *Szyjka, S., Mumba, F., & Wise, K. (2009). *Confirmation of the Psychometric Properties of the Context-Modified Questionnaire of Attitude Toward Statistical Graphs (QASG) for Measuring Pre-service Teachers' Attitudes Toward Line Graphs in Science (QALGS*). Paper presented at the National Association for Research in Science Teaching, Philadelphia, PA. March 21-24, 2010

156. *Wilson-Miles, E., Mumba, F., Chabalengula, V.M., *Mbewe, S., *Henson, H. & Wright, M. (2010). *A comparison of Pre-and In-service Teachers' Perception of Chemistry.* Paper presented at the 90th Annual Conference of the Association of Teacher Educators, February 13-17, 2010, Chicago, IL

157. *Mbewe, S., Mumba, F., *Wilson-Miles, E., Chabalengula, V.M., *Henson, H., & Wright, M. (2010). *Elementary Education Teachers' Perceived Difficulties and Benefits for Inquiry*. Paper presented at the 90th Annual Conference of the Association of Teacher Educators, February 13-17, 2010, Chicago, IL

158. *Sasser, S., Mbewe, S., Mumba, F., Chabalengula, V.M., *Wilson-Miles, E. & *Henson, H. (2010). *Resident Scientists' Perceived Instructional Training Needs for High School Science Teaching*. Paper presented the 90th Annual Conference of the Association of Teacher Educators, February 13-17, 2010, Chicago, IL

159. Mumba, F. (2010). *Types of observations*. Paper presented at Science in the South Conference, Southern Illinois University Carbondale, IL, Jan 2010.

160. *Wilson-Miles, E.N., Mumba, F., Chabalengula, V.M. & *Mejia, W.F. (2010). *Comparing pre-service and in-service elementary teachers' attitude towards chemistry.* Paper submitted to the National Association for Research in Science Teaching (NARST) 2010 Meeting, Philadelphia, PA

161. *Mejia, W.F., Mumba, F., Chabalengula, V.M., & *Wilson-Miles, E.N. (2010). *Elementary education in-service teachers' inquiry practice and their perceived difficulties and benefits for inquiry.* Paper presented at the National Association for Research in Science Teaching (NARST) 2010 meeting, Philadelphia, PA

162. Mumba, F., *Mejia, W.F., Chabalengula, V.M., & *Wilson-Miles, E.N. (2010). *Effect of interactive computer simulations on elementary education teachers' understanding of Kirchhoff's and Ohm's laws.* A paper presented at the Association of Science Teacher Education (ASTE) Annual Meeting, Sacramento, CA Jan 2010.

163. *Mejia, W.F., Mumba, F., & Chabalengula, V.M. (2010). *Resident Scientists' perceived benefits and difficulties for inquiry in schools.* Paper presented at the Association of Science Teacher Education (ASTE) Meeting, Sacramento, CA Jan 2010.

164. *Mbewe, S., Mumba, F., Wright, M., *Henson, H. & Chabalengula, V.M. (2009). *Effect of Interactive Computer Simulations on Elementary Education Teachers' Understanding of Light Matter Interactions*. Paper presented at Joint APS, AAPT, and SPS Meeting, San Marco, TX, Oct 22-24, 2009.

165. Mumba, F., *Mbewe, S., Chabalengula, V., *Wilson, E., Wright, M., *Henson, H., Hunter, W. (2009). *In-service elementary teachers' perceived Image of Chemistry, Cognitive abilities and Affection for Chemistry*. Paper presented at American Chemical Society, 61st Southeast Regional Meeting, San Juan, Puerto Rico. Oct. 2009

166. Mumba, F., *Wilson, E.N. & Chabalengula, V.M. (2009). *Integrating math and science in K-12 through process skills activity.* Accepted for presentation at Mt. Vernon Annual Conference for Teachers. Mt. Vernon, IL, Oct. 2009.

167. *Sasser, S., Mumba, F., Chabalengula, V.M., *Mbewe, S., *Wilson, E. & *Mejia, M. (2009). *Resident Scientists' Decision-Making on Science Curriculum, Instruction, and Assessment*. Paper presented at Brown Bag Series, College of Education and Human Services, Southern Illinois University Carbondale, Carbondale, IL, Sept. 15, 2009.

168. Mumba, F., *Wilson, E.N., Chabalengula, V.M. & Hunter, W.J.F (2009). *Scientific literacy themes coverage in a high school chemistry course.* Paper presented at the 238th American Chemical Society (ACS) National Meeting, Washington, DC, August 16-20, 2009.

169. *Wilson, E.N., Mumba, F., Chabalengula, V.M. & Wise, K. (2009). *Examining chemical literacy among pre-service teachers.* Paper presented at the 238th American Chemical Society (ACS) National Meeting, Washington DC, August 16-20, 2009.

170. *Hollman, G., Mumba, F. & Chabalengula, V.M. (2009). *Attitudes of non-science major undergraduate students towards studying physics, physics labs, and physics lectures.* Paper presented at the American Association of Physics Teachers Meeting. Ann Arbor, MI, July 25-29.

171. *Wilson, E.N., Mumba, F., Chabalengula, V.M. & Wise, K. (2009). *Attitudes of pre-service elementary teachers towards chemistry.* Paper presented at the Northwest Regional American Chemical Society Meeting, June 28, 2009, Tacoma, WA.

172. *Thankamani, J., Mumba, F. & Chabalengula, V.M. (2009). *Undergraduate students' attitude towards the study of chemistry.* Paper presented at the 38th Great Lakes Regional American Chemical Society (ACS) Meeting. Chicago, IL, May 13-16, 2009.

173. Mumba, F., Carver, J., Chabalengula, V.M. & Hunter, W.F.J. (2009). *Junior Chemists' understanding of the nature of scientific theories and laws.* Paper presented at the National Association for Research in Science Teaching (NARST) meeting, Orange Grove, CA, April 17-21.

174. Wise, K., & Mumba, F. (2009). *Effects of a learning cycle lesson on electromagnetic radiation on the achievement and beliefs about science teaching among elementary education pre-service teachers.* Paper presented at the National Association for Research in Science Teaching (NARST) Meeting, Orange Grove, CA, April 17-21.

175. Renzaglia, K., *Henson, H., Gibson, D., Mumba, F., Sipes, S. & Schuette, S. (2009). *SIUC HEART GK-12 partnerships for science education.* Paper presented at the 101st Annual meeting of the Illinois State Academy of Science, Southern Illinois University Edwardsville, April 17-18, 2009.

176. Mumba, F. (2009). *Inquiry levels and skills in Zambian high school chemistry course.* Paper presented at the American Education Research Association (AERA), San Diego, CA, April 13-17.

177. Mumba, F., *Wilson, E.N. & Chabalengula, V.M. (2009). *Closing the gap between math and science in K-12 through process skills activity.* Paper presented at the Closing the Gap: Practical Strategies for All Educators Meeting. John Logan College, Carterville, IL, March 30, 2009

178. *Jones, N., & Mumba, F. (2009). *Web-a-lution learning: Determining the impact of web-based instruction in the high school science classroom*. Paper presented at American Association for the Advancement of Science (AAAS), Chicago, IL Feb 12-16, 2009.

179. Mumba, F. & Chitiyo, M. (2009). *High school science teachers' curriculum and instructional decisions for inclusive classes*. Paper presented at the Association of Science Teachers Education (ASTE), Hartford, CT Jan 8-10, 2009.

180. Mumba, F. (2009). *Elements of effective teaching in higher education: A review of literature.* Paper presented the 7th Annual Hawaii International Conference on Education, Honolulu, Hawaii, Jan 4- 7 2009.

181. *Szyjka, S. & Mumba, F. (2009). *Preparing science teachers for inclusive classrooms: Components of a suggested model for science teacher training*. Paper presented at the 7th Annual Hawaii International Conference on Education. Honolulu, Hawaii, Jan 4- 7 2009.

182. Mumba, F., *Henson, H. & Wright, M. (2008). *Science, mathematics and action research for teachers (SMART) program at SIUC: Design framework and challenges.* Paper presented at Illinois Science Teachers Association (ISTA) Conference, Peoria, IL. November 14-15, 2008.

183. Morey, M.K., Langrall, C., Lind, K.K., Merrill, C.P., Mumba. F. & Hunter, W.J.F. (2008). *STEM master's degree programs: The challenges and accomplishments.* Paper presented at the Second Pacific Rim Conference on Education, Bloomington, IL, October 2008.

184. Mumba, F. (2008). *Inquiry-based science teaching in K-12 classrooms*. Paper presented at the National Science Foundation SIUC GK-12 program summer Institute. Touch of Nature, IL, June 2008.

185. Mumba, F. (2008). *What is Action research?* Paper presented at the National Science Foundation SIUC GK-12 Program Summer Institute. Touch of Nature, IL June 2008.

186. *Podoll, A., *O'Leary, S., *Henson, H., Mumba, F. & Pinter, N. (2008). *NSF GK-12 partnership for effective earth science education.* Paper presented at the Geological Society of America, 42nd Annual meeting, Evansville, IN, April 24-25, 2008.

187. Mumba, F., Chabalengula, V.M. & Hunter, W.F.J. (2008). *Balance of scientific literacy themes in Zambian high school chemistry textbooks, syllabus and examinations*. Paper presented at the National Association for Research in Science teaching (NARST), Baltimore, MD, April 2008.

188. Hunter, W.J.F. & Mumba, F. (2008). *In the middle: Chemical education and professional development at a doctoral I comprehensive university.* Paper presented at the 235th Meeting of the American Chemical Society, New Orleans, LA, March 2008.

189. Mumba, F. (2008). *How to conduct Action research in K-12 classrooms*. Paper presented at the ISBE and ROE # 02 Science and Mathematics Partnership Meeting, John Logan College, Carterville, IL, January 2008.

190. Mumba, F., Chabalengula, V.M. & Hunter, W. J.F. (2008). *Graphing skills among pre-service elementary science teachers.* Paper presented at the Association of Science Teacher Education (ASTE). St. Louis, MO January 2008.

191. Mumba, F. Hunter, W. & Chabalengula, V.M. (2007). *How do high school chemistry teachers teach chemistry in inclusive classes?* Paper presented at the 63rd Southwest Regional Meeting of the American Chemical Society (ACS), Texas Tech University, Lubbock, November 4-7, 2007.

192. Hunter, W. J. F., Higgins, T.B., Ferrence, G. M., Persson, S.L., Mumba, F. & House, R. (2007). *Value of Research: A framework for assessing professional growth.* Paper presented at the 234th Meeting of the American Chemical Society (ACS), Boston, MA, August 2007.

193. Mumba, F. (2007). *Action Research in K-12 classroom*. Paper presented at the National Science Foundation SIUC GK-12 Summer Institute. Touch of Nature, IL, June 2007.

194. Mumba F. (2007). *Different levels of inquiry & ways of integrating them in K-12 science curriculum.* Paper presented at the National Science Foundation SIUC GK-12 summer Institute. Touch of Nature, IL, June 2007.

195. Mumba, F. (2007). *Integration of Action Research in Math and Science partnership?* Paper presented at Illinois State Board of Education and Regional Office of Education 02 Science and Mathematics Partnership Meeting, John Logan College, Carterville, IL, May 2007.

196. Mumba, F., *Hennon, S., *Szyjka, S., *Pereles, N., & Hunter, W. (2007). *Effect of explicit instruction on high school physics students' knowledge and skills for constructing and interpreting graphs.* Paper presented at the National Association for Research in Science Teaching (NARST) Annual Meeting. New Orleans, LA, April 15-18, 2007.

197. Mumba, F., Chabalengula, V.M. & Hunter, W. (2007). *Balance of scientific literacy themes in Zambian high school physics course.* Paper presented at the American Education Research Association (AERA). Chicago: IL April 9-13, 2007.

198. Mumba, F. (2007). *Closing the gap between science and math through explicit integration approach.* Paper presented at Southern Illinois Prek-20 Education Alliance Annual Meeting. John A. Logan College, Carterville, IL, March 23, 2007.

199. Mumba, F. (2007). *Integration of math and science through inquiry.* Paper presented at the Science in the South Conference, Southern Illinois University Carbondale, IL, March 2007.

200. Mumba, F. (2006). *Analysis of quantitative and qualitative data for Action Research project*. Paper presented at ISBE and ROE # 02 Science and Mathematics Partnership Meeting, John Logan College, Illinois, Dec. 2, 2006.

201. Hunter, W. F.J., Mumba, F., Peter Goff, & Jeffrey S. Carver (2006). *Catalyzing a transition for students: Supporting human resources for under-represented groups in Illinois.* Paper presented at the 232nd American Chemical Society (ACS) National Meeting, San Francisco, CA, September 10-14, 2006.

202. Hunter W. J. F., Bodner, G.M. & Mumba, F. (2006). *Action research as a theoretical framework for chemical education research.* Paper presented at the 231st Meeting of the American Chemical Society (ACS), San Francisco, CA, September 2006.

203. Hunter W. J. F., & Mumba, F. (2006). *Transition challenges and successes for 2YC students to 4YC*. Paper presented at the 231st Meeting of the American Chemical Society (ACS), San Francisco, CA, September 2006.

204. Mumba, F. (2006). *Differentiated science instruction: When and how?* Paper presented at the Southern Illinois Educators Alliance Annual Meeting. Southern Illinois Carbondale, June 2006.

205. Mumba, F., Chabalengula, V. M., Hunter, W., & Moore, C. (2006). *Science and mathematics Teaching Fellows' instructional planning for K-12 classrooms*. Paper presented at the American Education Research Association (AERA). San Francisco: CA April 7-11, 2006.

206. Mumba, F., Chabalengula, V. M., Hunter, W., & Moore, C. (2006). *Science Teaching Fellows conceptions of teaching.* Paper presented at the National Association for Research in Science teaching (NARST): San Francisco, CA, April 3-7.

207. Mumba, F. (2006). *Integrating math and science in K-12 classrooms.* Paper presented at the Science in the South Conference, Southern Illinois University Carbondale, March 2006.

208. Mumba, F. (2005). *A model for explicit mathematics and science integration*. Paper presented at the Mt. Vernon Science and Mathematics Partnership Meeting, Mt. Vernon, Illinois, Dec. 2, 2005.

209. Mumba, F. Chabalengula, V. Hunter, W., Moore, C. (2005). *Chemistry Teaching Fellows' conceptions of teaching.* Paper presented at Regional American Chemical Society (ACS), Joplin Missouri, October 26, 2005.

210. Mumba, F. (2005). *What can we do to help high school students prepare for undergraduate chemistry traditional labs?* Paper presented at the Illinois Association for Chemistry Teachers [IACT] Fall Meeting, Illinois State University, October 7, 2005.

211. Mumba, F. Chabalengula, V.M., Hunter, W. F.J., Moore, C. & Grogg, J. (2005). *Views and Practices in Planning for Teaching: A case study of Graduate Teaching Fellows working in a school-university partnership project*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Meeting. Dallas, TX, April 12, 2005.

212. Hunter, W. F.J., Moore C. J., Plantholt, M. & Mumba, F. (2004). *NSF GK12 PRISM Project: Innovative inquiry activities for grades 6–12 science and mathematics.* Paper presented at the National Science Teachers Association meeting (NSTA), Indiannapolis, IN, November 4-6, 2004.

213. Mumba, F. & Bassoppo-Moyo, T. C. (2004). *Using computer-based instructional supplements to enhance high school students' knowledge and skills in selected difficult chemistry topics.* Paper presented at the Association for Educational Communications & Technology Convention. Chicago, IL, Oct. 20-23, 2004.

214. Mumba, F., Rollnick, M., Chabalengula, V. M. & Hunter, W. (2004). *Codeswitching in chemistry lessons in South African township high schools.* Paper presented at the 36th American Chemical Society (ACS) Great Lakes Regional Meeting. Peoria, IL, October 17-20, 2004.

215. Mumba, F., Chabalengula, V. M., & Bassoppo-Moyo, T. C. (2004). *Effectiveness of using computer-assisted supplementary instruction for teaching selected algebra topics at a laboratory high school.* Paper presented at the Graduate Research Symposium. Illinois State University, Normal, IL. April 23, 2004.

216. Chabalengula, V., Mumba F., Hunter, W., Moore, C., Grogg, J., & Plantholt, P. (2004). *Professional growth of ISU graduate students and K-12 teachers as they work together to improve mathematics and science education in schools.* Paper presented at the Graduate Research Symposium. Illinois State University, Normal, IL. April 23, 2004.

217. Hunter, W., Carver, J., Mumba, F., Bergman, J., Chabalengula, V., Taylor, C., Millen, K. & Micklos, A. (2004*). Experimental data in the hands and minds of students.* Paper presented at the 227th American Chemical Society (ACS) National Meeting, Anaheim, CA, March 28-April 1, 2004.

218. Bassoppo-Moyo, T. C, & Mumba, F. (2004). *Using computer-assisted instruction in high school algebra.* Paper presented at the Society for International Technology Education Conference, Atlanta, GA, March 2004.

219. Mumba F., Hunter, J. F., Moore, C., Grogg, J., Plantholt, M. & Chabalengula, V.M. (2004). *Partnerships in PRISM project: An evaluation perspective.* Paper presented at the Symposium on Partnership in Teaching and Learning, Bloomington, IL. January 7, 2004.

220. Hunter, W.J.F., Mumba, F, Chabalengula, M., Oke, T., Grogg, J., Plantholt, M. & Moore, C. (2003). *Lessons-learned in working in high school science and math classrooms.* Paper presented at the Regional National Science Teachers Association (NSTA) Meeting, Kansas City, MO, November 2003.

221. Hunter, W. J.F., Grogg, J., Thornton, C., Plantholt, M. & Moore, C. Mumba, F. (2003). *Illinois State University PRISM project: Integrating science and math through inquiry*. Paper presented at the Regional National Science Teachers Association (NSTA) meeting, Minneapolis, MN, October 2003.

222. Mumba, F., Hunter, W. J. F., Moore, C. J., Chabalengula, V. M. Grogg, J., Thornton, C. & Plantholt, M. (2003*). Professional growth through interactions between K-12 teachers and graduate students in chemistry, mathematics and biology*. Paper presented at the 226th American Chemical Society (ACS) National meeting. New York, NY. September 7-11, 2003.

International conference presentations (N=43)

223. Mumba, F. *Pottmeyer, L. & *Ojeogwu, J. (2025). *Student Learning in Engineering Design Integrated Biology Unit*. Paper presented at the European Science Education Research Association (ESERA) Conference, August 25-29, Copenhagen, Denmark.

224. Mumba, F. & *Ojeogwu, J. (2025). *Assessing the Quality of Pre-service Science Teachers' Engineering Design Integrated Science Units*. Paper presented at the Australasian Science Education Research Association (ASERA) conference; July 1-4, 2025. Melbourne, Australia.

225. *Ojeogwu, J. & Mumba, F. & (2025). *A Systematic Review of Literature on Preparing Pre-service Teachers for Engineering Integrated Science Teaching: Interventions, Outcomes, and Gaps*. Paper presented at the Australasian Science Education Research Association (ASERA) conference; July 1-4, 2025. Melbourne, Australia.

226. Mumba, F. & *Ojeogwu, J. (2025). *Pre-Service Science Teachers' Perceptions of Engineering, Design and Technology*. Paper presented at the Nordic Educational Research Association (NERA) conference, March 5-7, 2024; Helsinki, Finland.

227. Mumba, F. (2024). *A Model for Preparing Pre-service Science Teachers in Engineering Design Integrated Science (EDIS) Teaching*. Paper presented at the Australasian Science Education Research Association (ASERA) conference; July 2-5, 2024. Auckland, New Zealand

228. Mumba, F. (2024). *Developing Pre-service Teacher ' Pedagogical Orientations towards Inquiry Science Teaching*. Paper presented at the Nordic Educational Research Association (NERA) conference, March 6-8, 2024; Malmo, Sweden.

229. Mumba, F. (2024). *Association between Preservice Teachers' Conceptions of Science Teaching and Self-efficacy for Inquiry Science Teaching*. Paper presented at Nordic Educational Research Association (NERA) conference, March 6-8, 2024; Malmo, Sweden.

230. Mumba, F., *Pottmeyer, L. & *Rutt, A. (2024). *Representation of Essential Features of Inquiry in Science Activities- US Journal for Science Teachers*. Paper presented at Southern Africa Association for Research in Mathematics, Science and Technology Education (SAARMSTE) conference, January 16-18, 2024, Windhoek, Namibia.

231. Mumba, F. *Pottmeyer, L. & *Rutt, A. (2023). *Inquiry Representation in Science Practitioner Journals for Teachers*. Paper presented at the European Science Education Research Association (ESERA) Conference, Aug. 28-Sept 1, 2023; Cappadocia, Turkey.

232. Mumba, F., Ji Hoon, R. & *Ojeogwu, J. (2023). *Students Learning outcomes in Problem-Based Guided Inquiry Chemistry Laboratory Courses*. Paper presented at the European Science Education Research Association (ESERA) Conference, Aug. 28-Sept 1, 2023; Cappadocia, Turkey.

233. Mumba, F. (2023). *Affective Learning outcomes in Problem-Based Guided Inquiry Chemistry Labs.* Paper presented at the Australasian Science Education Research Association (ASERA) conference; June 27-30, 2023. Cairns Convention Center, Cairns, Australia.

234. Mumba, F. & Ji Hoon, R. (2022). *Improving Student Learning outcomes through Project Based Guided Inquiry Chemistry Labs*. Invited Speaker – International Union for Pure and Applied Chemistry (IUPAC) Conference in Chemistry Education, ICCE 2022: 18 - 22 July 2022, Cape Town, South Africa.

235. Mumba, F. (2019). *Impact of Engineering Design Integrated Science Teaching on Student Perceptions of Engineering Design*. Paper presented at the Science Conference, Pusan National University, Busan, South Korea; Dec 21, 2019.

236. Mumba, F. (2019). *Pre-service Science Teachers' Understanding of Engineering Design and Scientific Method*. Paper presented at the 13th European Science Education Research Association (ESERA) Conference, Aug. 26-30, 2019; Bologna, Italy.

237. Mumba, F., Wheeler, L., Chabalengula, V.M. & *Ochs, L. (2019). *Developing Chemistry Teaching Assistants' Pedagogical Orientations towards Inquiry Instruction*. Paper presented at the American Educational Research Association (AERA) Meeting, April 5-9, 2018; Toronto, Canada.

238. Chabalengula, V.M., Mumba, F., & *Ochs, L. (2019). *Chemistry Teaching Assistants' Beliefs in Project-Based Guided Inquiry Instruction*. Paper presented at the American Educational Research Association (AERA) Meeting, April 5-9, 2019; Toronto, Canada.

239. Chabalengula, V.M. & Mumba, F. (2019). *Impact of PBGI instruction on Chemistry Teaching Assistants' Pedagogical Orientations and Conceptions of Science Teaching*. Paper presented at Southern African Association for Mathematics, Science, Technology Education Conference, Durban, South Africa, 15-17, January 2019.

240. Rollnick, M., Toerien, R. & Mumba, F. & Davidowitz, B. (2019). *Is PCK for Teaching Chemical Bonding only possessed by teachers?* Paper presented at Southern African Association for Mathematics, Science, Technology Education Conference, Durban, South Africa, 15-17, January 2019.

241. Mumba F., Toerien, R., Rollnick, M., & Davidowitz, B. (2019). *Comparing South African and US chemistry teaching assistants' TSPCK for chemical bonding.* Paper presented at Southern African Association for Mathematics, Science, Technology Education Conference, Durban, South Africa, 15-17, January 2019.

242. Mumba, F., *Ochs, L., Rollnick, M. & Toerien, R. (2018). *US Chemistry Teaching Assistants' Knowledge of Chemical Bonding & the Explanatory Principles they use to Explain it*. Paper presented at Southern African Association for Mathematics, Science, Technology Education Conference, Gaborone, Bostwana, 16-19, January 2018.

243. Mumba, F. (2018). *Engineering Design in Science Teacher Education Project: Teachers' Pedagogical Knowledge for Engineering Design Integrated Science Teaching, and Student Learning*. Paper presented at Southern African Association for Mathematics, Science, Technology Education Conference, Gaborone, Bostwana, 16-19, January 2018.

244. *Banda, A., & Mumba, F. (2018). *Chemical reasoning and ability: A case of Mufulira College of Education pre-service science teachers*. A paper presented at the 16th Regional Conference for Mathematics, Science, and Technology Education in Africa (COMSTEDA 16), Maun, Botswana, November 5 - 9, 2018.

245. *Banda, A. & Mumba, F. (2017). *Student Teachers' Abilities to Identify Electrochemistry Misconceptions and their Pedagogical Ideas for addressing them*. 3rd National Symposium on Chemistry, Materials and Energy, Lusaka, Zambia, Nov 9-10, 2017.

246. *Banda, A & Mumba, F. (2016). *Pre-service Science Teachers' Misconceptions on Selected Topics in Chemistry.* Presentation at the Postgraduate Research Conference. Theme: Applying Sustainable Development. Copperbelt University, Zambia, Dec 15, 2016.

247. Mumba, F. & *Ochs, L. (2017). *Chemistry Teaching Assistants' TSPCK for Chemical Bonding: Representations and Teaching Strategies*. Symposia Session: Teachers' Knowledge for Teaching Chemical Bonding: Scope & Trajectories. European Science Education Research Association (ESERA) Conference, Dublin, Ireland, August 21-25, 2017.

248. Mumba, F., *Ochs, L., *Blankenship, S. & Chabalengula, V. (2017). *Essential features of inquiry in the American Biology Teacher and Journal of Chemical Education journals*. Paper presented at the Australasian Science Education Research Association (ASERA) conference; University of Technology Sydney, Australia; June 27-30, 2017.

249. Mumba, F, & Wheeler, L. (2017). *Developing US Teaching Assistants' Pedagogical Knowledge of Inquiry Science Teaching and Assessing the impact on Student Learning*. Paper presented at Southern African Association for Mathematics, Science, Technology Education Conference, Bloemfontein, South Africa, 17-20, January 2017.

250. Mumba, F. & *Ochs, L. (2017). *US Middle School Science Teachers' Conceptions of Inquiry*. Paper presented at Southern African Association for Mathematics, Science, Technology Education Conference, Bloemfontein, South Africa, 17-20, January 2017.

251. *Ochs, L. & Mumba, F. *Pre-Service Teachers' Perceived Relevance of Engineering Practices in Science Teaching*. Paper presented at Southern African Association for Mathematics, Science, Technology Education Conference, Bloemfontein, South Africa, 17-20, January 2017.

252. *Banda, A., Mumba, F. & *Mbewe, S. (2013). *High school pupils' chemical literacy*. Paper presented at the UNZA-Hiroshima Research Dissemination Seminar, Lusaka, Zambia, August 21, 2013.

253. *Banda, A., Mumba, F. & *Mbewe, S. (2012). *Challenges of meeting the goals of chemistry education as perceived by Zambian pre-service science teachers*. A paper presented at the university of Zambia- University of Hiroshima research dissemination seminar. University of Zambia, Lusaka, August 23, 2012.

254. Chabalengula, V.M., Zhu, M. & Mumba, F. (2011). *A Novel Framework for Science Teacher-Leaders in Computer Simulations and Animations Integration*. A paper presented at the 4th Redesigning Pedagogy International Conference, Singapore, May 30-June 1, 2011.

255. Bu, L., Mumba, F., *Henson, H., Wright, M., & *Alghazo, Y. (2011). Problem Solving Using GeoGebra: *The Experience of Inservice Mathematics and Science Teachers*. Paper presented at the North American GeoGebra Conference, Toronto, Ontario, Canada, June 17-18, 2011.

256. Mumba, F., Bu, L., & *Alghazo, Y. (2011). *GeoGebra as a Pedagogical Tool: Two Lesson Design Examples*. Paper presented at the North American GeoGebra Conference, Toronto, Ontario, Canada, June 17-18, 2011.

257. Mumba, F., Chabalengula, V.M., Henson, H. & Lind, K. (2011). *Primary and Middle School Science Teachers' Instructional Practice and their Perceived Benefits and Difficulties of Inquiry.* Paper presented the 4th Redesigning Pedagogy International Conference, Singapore, May 30-June 1, 2011.

258. Chabalengula, V.M., Mumba, F., Henson, H. & Bu, L. (2010). *Design, Implementation & Impact of Mathematics and Science Project on US Primary and Middle School Teachers.* Paper presented at the Science, Technology, Engineering and Mathematics (STEM) International conference, Queensland University of Technology, Brisbane, Australia, November 26-27, 2010.

259. Mumba, F., Zhu, M. & Chabalengula, V.M. (2010). *Partnership for Improved Achievement in Science through Computational Science in Southern Illinois in USA*. Paper presented at the Science, Technology, Engineering and Mathematics (STEM) International conference, Queensland University of Technology, Brisbane, Australia, November 26-27, 2010.

260. Mumba, F., *Henson, H., Gibson, D., Renzaglia, K. & Chabalengula, V.M. (2010). *Scientists' Perceived Benefits and Difficulties of Inquiry in US Schools*. Paper presented at the Science, Technology, Engineering and Mathematics (STEM) International conference, Queensland University of Technology, Brisbane, Australia, November 26-27, 2010

261. Mumba F., Chabalengula V.M., Hunter W.J.F. Lorsbach T. & Moore, C.J. (2005). *Mathematics and science Teaching Fellows' development and understanding of the nature of science.* Paper presented at the Eighth International History, Philosophy, Sociology & Science Teaching Conference, Leeds, England, July 2005.

262. Mumba F., Chabalengula, V.M., Hunter, J. F., Moore, C., Grogg, J., Thornton, C. & Plantholt, M. (2004). *Exploration of the content and nature of reflective practices of Graduate Teaching Fellows in a School-University partnership project.* Paper presented at the National Association for Research in Science Teaching (NARST) Annual Meeting. Vancouver, Canada, April 1-4, 2004.

263. Mumba, F., Rollnick, M. & White, M. (2001). *How wide is the gap between high school and first-year chemistry at University of the Witwatersrand?* Paper presented at the 50th CONASTA Conference, Sydney, Australia, July 2001.

264. Mumba, F., White, M. & Rollnick, M. (2001). *The interface between high school and first-year university chemistry at the University of the Witwatersrand - Teaching aspects*. Paper presented at the Ninth Annual Meeting of the Southern African Association for Research in Mathematics, Science and Technology Education (SAARMSTE), Maputo, Mozambique, January 2001.

265. Mumba, F. White, M. & Rollnick, M. (2000). *What abilities and knowledge do first-year chemistry lecturers and high school teachers perceive important for first-year students at the University of the Witwatersrand?* Paper presented at the Science and Technology Education (STE) Conference, Cape Town, South Africa, September 2000.

Invited Presentations (N= 20)

1. Mumba, F. (2024). Quantitative data analysis in science education research. SAARMSTE research school for PhD and Postdocs, Mandela University, South Africa, July 18, 2024.

2. Mumba, F. (2024). STEM in STEM secondary schools in Zambia. Academy of Science of South Africa, Johannesburg, April 24, 2024.

3. Mumba, F. (2024). Integration of Engineering Design in Science Teacher Education Program: Successes and Challenges. Copperbelt University, Zambia. July 5, 2024.

4. Mumba, F. (2024). Research Grant Writing Proposal, and Implementation. University of Namibia, Windhoek, Namibia, August 5-6, 2024.

5. Mumba, F. (2023). Representation of inquiry in Science Practitioner Journals. Witwatersrand, Johannesburg, South Africa, August 1, 2023.

6. Mumba, F. (2023). Preparing science teachers in Language and Literacy integrated science instruction: A Model and outcomes. Universität Duisburg-Essen, German, June 22,2023.

7. Mumba, F. (2023). Quantitative data analysis in science education research. SAARMSTE research school for PhD and Postdocs, University of KwaZulu Natal, Durban, South Africa, July 5, 2023.

8. Mumba, F. (2021). Engineering Design in Science Teacher Education & Learning Outcomes. Witwatersrand University, Virtual presentation; October 19,2021

9. Mumba, F. (2017). Integration of engineering design in science teacher education, Witwatersrand University, Johannesburg, South Africa, July 14, 2017.

10. Mumba, F. (2017). Writing Research grants, Southern Africa Association for Research in Mathematics, Science and Technology Education (SAARMSTE) research school for PhD and Postdoctoral research fellows, South Africa, July 2017.

11. Mumba, F. (2017). Action research. Chinese delegation, School of professional studies, University of Virginia, spring 2017

12. Mumba, F. (2016). Action research in schools. Chinese delegation, School of professional studies, University of Virginia, fall 2016

13. Mumba, F. (2016). Getting your research. New Faculty Orientation Provost's office, 2015 & 2016.

14. Mumba, F. & Hunter, W. (2016). Challenges in the United States' Next Generation Science Standards: Looking for Solutions. Witwatersrand University, Johannesburg, South Africa, June 2016.

15. Mumba, F. (2015). VSUP- Mathematics and Science Partnership, University of Virginia, Fall 2015.

16. Mumba, F. (2015). Teaching science by inquiry. Chinese delegation, School of professional studies, University of Virginia Fall 2015.

17. Mumba, F. (2015). Role of Education in resilience and sustainability -Stewardship and Governance strand. Resilience Forum. University of Virginia. Nau Hall Auditorium; May 7, 2015.
18. Mumba, F. (2014). VSUP – Mathematics and science partnership, Murray high school, Charlottesville, fall 2014.

19. Mumba, F. (2014). VSUP – Mathematics and Science Partnership, Murray high school, Charlottesville, fall 2014.

20. Mumba, F. (2007). Action research in science classrooms, Regional Office of Education # 02, June 2007

OTHER SCHOLARLY ACTIVITIES

Scholarship in the Media

- Agents of Change- Engineering Design in Teacher Education |
- With Fulbright Award, UVA Professor Will Bring Science Education Model to Zambia | University of Virginia - School of Education and Human Development
- Sublime Slime: Where Biology and Engineering Meet, High School Students Benefit. November 10, 2017. https://news.virginia.edu/content/sublime-slime-where-biology-and-engineering-meet-high-school-students-benefit
- Researchers, Students Meet at the Intersection of Engineering and Science. August 9, 2016. https://news.virginia.edu/content/researchers-students-meet-intersection-engineering-and-science

- U.Va. Faculty Aim to Boost STEM Education from K through Ph.D. September 28, 2014. https://news.virginia.edu/content/uva-faculty-aim-boost-stem-education-k-through-phd
- U.Va. Faculty Win Grants to Boost STEM Education in Virginia Public Schools. May 1, 2014. https://news.virginia.edu/content/uva-faculty-win-grants-boost-stem-education-virginia-public-schools

Professional Development

Leadership in Academic Matters (LAM)- Fall 2018. This training was organized and done by the UVA Provost's office.

Program and Course development

University of Virginia

UVA Noyce Scholarship Program (2014-present)

1. Since 2014, we (Larry Richards, Reid Bailey, Jennie Chiu, Robert Tai, Dean Harman, Vivien Chabalengula, and I) have designed and implemented two Robert Noyce scholarship programs for pre-service teachers. Both programs are funded by the National Science Foundation, total of **$2.7 million**. I serve as the Principal Investigator (PI). Four Departments (CISE, Systems engineering, Mechanical Engineering and Aerospace, and Chemistry) are involved in the projects. The projects have offered scholarships ($20,000 each) to **95** pre-service science teachers who are now teaching in high-need schools in Virginia and other states. **One of the most successful NSF Noyce Projects.**
2. Created 5 course syllabuses for the new undergraduate degree (BSc. Ed) program in secondary science teacher education program in CISE dept.

New Courses Development

- EDIS 2655: Integrated Science for Teachers, UVA (2025),UVA
- EDIS 5049 History of Science for Teachers (2017), UVA
- CI 427 Science Process and Content for Teachers (2007), SIUC
- CI 522 Integrating technology in math and science (2008), SIUC
- CI 428 Science Methods and Curriculum Development for K-8 (2007), SIUC
- CI 539 Math and science teacher leadership (2008), SIUC

Southern Illinois University Carbondale

1. ***Chemistry Teacher Education Degree Program*** -2012

Developed a chemical education degree program for pre-service chemistry teachers in the Department of Chemistry.

2. ***Masters' Degree in Mathematics and Science Education***:

My colleagues (Dr. Mary Wright- Mathematics, and Harvey Henson- Geology) and I developed and implemented a Masters' Degree in Mathematics and Science Education (MSMSEd) program for in-service elementary and middle school mathematics and science teachers through our Science, Mathematics and Action Research for Teachers (SMART) program. This program was funded by the US Department of Education through Illinois State Board of Education (ISBE), ***($1.5 million)***. Masters' Degree program started in spring 2009 with a cohort of 27 teachers from schools in Southern Illinois. The first Cohort of 27 teachers graduated in fall 2010. Second cohort of 27 teachers graduated in fall 2012. Seven Departments on SIUC campus were involved in this degree program.

SCHOLARLY ACTIVITIES IN PROGRESS

Manuscripts in Review

1. Mumba, F. (Review). A Model for Characterizing Engineering Design and Science Integrated Instructional Materials. *Journal of Pre-College Engineering Education Research (J-PEER).*

2. Mumba, F., Rollnick, M., *Pottmeyer, L., Davidowitz, B. & Toerien, R. (Review). South African and US University Chemistry Teaching Assistants' Topic-Specific Pedagogical Content Knowledge for Chemical Bonding. *African Journal of Mathematics, Science and Technology Education.*

Manuscripts in preparation

*Note:*indicates current or former student or postdoctoral fellow co-author(s).*

1. Mumba, F. Pre-service teachers' perceptions of engineering, design, and technology.

2. *Ojeogwu, J. Mumba, F. Pre-service implementation of engineering design integrated science units in schools.

3. *Rutt, A & Mumba, F. Creating language and literacy integrated science lessons.

4. Mumba, F. Chemistry Teaching Assistants' Beliefs in Project-Based Guided Inquiry Instruction.

5. Mumba, F. Impact of PBGI instruction on Chemistry Teaching Assistants' Pedagogical Orientations and Conceptions of Science Teaching.

6. Mumba, F. Student learning outcomes in Project-based Guided Inquiry Chemistry Labs Perceptions, attitudes, content knowledge.

7. *Pottmeyer, L. & Mumba, F. Inquiry representation in elementary and middle school science practitioner journals.

8. Mumba, F., & *Banda, A. Zambian pre-service teachers' pedagogical knowledge for Engineering design integrated science teaching.

9. *Pottmeyer, L. & Mumba, F. Pre-service Teachers' conceptions of Engineering Design integrated Science Teaching

III. TEACHING EXPERIENCE AND MENTORING

Courses Taught

University of Virginia

- EDIS 5050: Teaching Science in Secondary Schools I, fall, 2013-present
- EDIS 5051: Teaching Science in Secondary Schools II, spring, 2013-present
- EDIS 4885: Field Placement, fall semester, 2013-2019
- EDIS 5049: History of Science for Teachers, spring 2017-present
- EDIS 5885: Student teaching internship- fall 2013-2019 & spring 2019-present
- EDIS 5875: Seminar- Spring 2019-present
- EDIS 5855: Seminar- fall 2019-present
- EDIS: 5865: Field placement- fall 2019-Present
- PHYS 6263 (sections, 502, 503, 504, 505): Electricity and Magnetism. Co-taught with Richard Lindgren (Physics), summer 2014 & 2015.
- EDIS 9998: Doctoral Research Apprenticeship- spring 2014-present
- EDIS 9999: Non-Topical Research, Doctoral -spring 2014-present

Southern Illinois University Carbondale, 2005-2013

- CI 539 Teacher Leadership in Math & Science, summer.
- CHEM 589: Special chemistry topics, summer.
- CHEM 506 Chemistry Topics for Teachers, summer.
- CI 468 Science Methods for Middle and High School, fall & spring
- CI 522 Integrating technology in math and science, summer
- SCI 503B Science for Elementary Teachers , fall &spring

- SCI 503A Science for Elementary Teachers, fall &spring
- CI 590 D Readings in Science, fall &spring
- CI 594 D Practicum in Science Education, fall &spring
- CI 395 D Science Practicum, fall &spring
- CI 426 Introduction to Elementary Science Teaching Methods, fall &spring
- CI 427 Science Process and Content for Teachers, fall &spring
- CI 585D Topical seminar- Science education, fall &spring
- CI 590M Readings- Science, fall &spring
- CI 593M Readings- Science, fall &spring
- CI 590D: Readings- Science, fall &spring
- CI 393D: Individual Research Education, fall &spring

Illinois State University, 2001-2013

Note: Some courses were taught online.

- CHE 401.04 Advanced Chemistry Demonstrations: Atomic and Molecular Structure. Fall 2013- online graduate course for in-service teachers.
- CHE 402.01 091 - Teaching Chemistry in the laboratory: An Experimental Science. Summer 2013- online graduate course for in-service teachers
- CHE 401.03 091 – Advanced Chemistry Demos: Kinetics, Equilibrium, & Acids & Bases. Spring 2013 (Part-time)- online graduate course for in-service teachers.
- CHE 402.01 091 - Teaching Chemistry in the Laboratory: An Experimental Science. Spring 2013 (Part-time), online graduate course for in-service teachers.
- CHE 401.02 Advanced Chemistry Demonstrations: Reactions, Stoichiometry, and the Mole, fall 2012 (Part-time)- online graduate course for in-service teachers.
- CHE 403.01 Teaching Science Safely: Secondary School, summer 2012 & fall 2012 (Part time) - online graduate course for in-service teachers.
- CI 453 Instructional Strategies, (co-taught with Drs. Hunter, Carver & Chabalengula)- online graduate course for in-service teachers.
- CHE 361 Chemistry Teaching Methods, (co-taught with Dr. William Hunter), undergraduate course.
- CI 351 Middle School Science Methods, (co-taught with Dr. Jerry Jinks), undergraduate course
- CHE 112 General Chemistry Labs, fall 2001 (co-taught with Dr. William Hunter), undergraduate course.
- CHE 112 General Chemistry Labs, spring 2002, undergraduate course.

Witwatersrand University, South Africa, 1999-2000

- C110 General Chemistry Labs, fall and spring
- C110 General Chemistry Tutorials, fall and spring

Dominican Convent high school, Zambia, 1994-1998

- Pure Chemistry
- Pure Physics
- Science (Chemistry & Physics)
- Environmental Science

STUDENT MENTORSHIP

Masters in Teaching degree Students

I advise all science students in the Masters in Teaching (MT) degree program. Since 2013, I have advised **113** MT students.

Robert Noyce Scholarship Recipients

I have secured **$2.7m** in scholarships for Students MT (Science). Since 2016 **95 students** have received Noyce scholarships. Students are mentored in *grant writing*, engineering design, and conference presentations, and article writing for publication.

Masters in Education Degree Students (graduation & placement)

- Sydney Shelton- (Curriculum & Instruction), UVA, Dec 2018; Science teacher, VA
- Hilary Ramp- (Curriculum & Instruction), UVA, May 2015; Science teacher, VA
- Asiana Banda - (Science Education), SIUC, August 2012 ; Senior Lecturer, Head of Department, Copperbelt University, Zambia.
- Miranda Tucker - (Science Education), SIUC, Dec 2011; Science teacher, IL
- Angela Box - (Science Education), SIUC, May 2012; STEM Associate Director, SIUC
- Yang Zhao - (Computer Science), SIUC, May 2012; Computer scientist
- Jonathan Chitiyo (Science Education), SIUC, May 2011; Associate Professor, University of Pittsburgh, Bradford, PA.
- Greg Holman (Science Education), SIUC, August 2010; Science Instructor, Rend Lake College, IL
- Erin Wilson (Science Education), SIUC, August 2010; Education consultant, FL
- Mary Jo Osborn, (Science Education), SIUC, August 2008; Retired Teacher, IL
- Anita Hoffman (Science Education), SIUC, December 2008; Science Teacher, IL

Postdoctoral Fellow Mentored (year and placement)

- Stephen Malcom, 2019-2020. Current position: Lecturer Witwatersrand University, South Africa

Doctoral Dissertation Committee Chaired (year graduated & placement)

- John Ojeogwu (Science Education), PhD. Dissertation Committee Chair, May 2024, Postdoctoral Fellow, University of Nevada, Las Vegas, NV.
- Alexis Rutt (Science Education),PhD. Dissertation Committee Chair, May 2022, Assistant Professor, James Madison University, VA.
- Laura Ochs Pottmeyer (Science Education), PhD. Dissertation Committee Chair, May 2019, Research Associate, Carnegie Mellon University, PA
- Harvey Henson (Science Education), PhD Dissertation Co-Chair, December 2015, Associate Professor, Southern Illinois University Carbondale, IL
- Gilbert Kalonde (Technology Education), PhD Dissertation Co-Chair, August 2013, Associate Professor, Montana State University, MT.
- Asiana Banda (Science Education), PhD Dissertation -Chair, August 2013, Senior Lecturer, Copperbelt University, Zambia
- Simeon Mbewe (Science Education), PhD Dissertation -Chair August 2012, Lecturer, University of Zambia.
- Sebastian Szyjka (Science Education), PhD Dissertation Co-Chair, August 2009. Professor, Western Illinois University.

Dissertation committee member

- Xin Xia (Science Education). Preliminary Exam Committee member, March 2023
- Rachel Meyer (Teacher Education), PhD. Dissertation committee member , May 2023
- Nicole Frittrik , (Mathematics Education), Ed.D & Internship committee member, Spring 2016
- Crystal DeJaegher (Technology Education), PhD. Dissertation Committee member. Spring 2015
- Nathan Nolenc (Science Education), PhD. Dissertation committee member, Spring 2015,
- Amanda Massie (Math education), Preliminary exam committee member. Spring 2015
- Daniel Read (Science Education), PhD Dissertation Committee member, December 2015
- Jenay Sharp (Science Education), PhD Dissertation Committee member, May 2015,
- Amy Germundson (Science Education), PhD Dissertation Committee member, December 2015
- Anthony Agebh (Curriculum Studies), PhD Dissertation Committee member, May 2015
- Ven Ney Wong (Analytical Chemistry), PhD Dissertation Committee Member, August 2011.
- Nastassia Jones (Microbiology), PhD Dissertation Committee Member, August 2011.
- William Mejia (Technology Education), PhD Dissertation Committee Member, Dec. 2010.
- Philip Short (Science Education), PhD Dissertation Committee member , August 2007.

Research and Teaching Assistants

*** Research Assistant & [T] Teaching Assistant**

- Simeon Mbewe*
- Asiana Banda*
- Sebastian Szyjka* [T]
- Alexis Rutt* [T]
- Laura Pottmeyer*[T]
- John Ojeogwu*[T]
- Mathew Rice*
- Mollie Deuel*
- Sarah Blackenship*
- Jenay Sharp*
- Amanda Gonci [T]
- Angie Skeeles-Worley[T]
- Rachel van Aswegen

In-service Teachers co-mentored with Richard Lingren (Physics) at UVA (N=16)

Michele Bambury, Clara Colby, Jenifer Donalson, Carolyn Elliott, Karl Gron, Stephanie Lin, Eva O'hare, Duangporn Rueksomboondee, Teresa Seto, Mallary Brown, Mary Hayden, Carolyn Lewis, Louise Schaeffler, Ricardo Stephens, Shawn Becker & Jennifer Thomason

In-service teachers mentored at SIUC (N=50)

Master of Science in mathematics and Science Education (MSSMED) degree program.

Cohort # 1: 27-graduated December 2010

Carie Arbuckle, Megan Beelman, Denise Brown, Amy Buch, Kerry Denny, Kimberly Dillow, Jennifer Eagle, Jennifer Fickensche, Kim Harmsen, Tammy Herbert, Ashlee Howell, Kimberly Leonard, Janae McGee, Heather Melton, Chris Midden, Susan Polino, Marjorie, Cheryl Rose, Jeanne Sanders, Jaye Shanks, Jessica Soderlund, Heather Sunny, Lisa Taylor, Guy Weber, Dayna Will, Julie Wittenborn, and Laurie Wright.

Cohort #2: 23-graduated December 2012

Boston, Brittany R., Dunderdale, Holly R, Frick, Nicolle, Granados, Bridget S., Kania, Natasha S, Lynn, Marcus A., Marks, Rusty D., Mathew, Amanda F., May, Monica A., Peas, Tara R., Peterson, Scott W., Rayburn, Candace R., Simer, Charles E., Stanton, Stacy J., Thery, Jennifer J., Turner, James E., Waller, Jenny A., Williams, Nicolette K., Candace, Walker, Banks Bobbie, J., Bowen, Melissa, R., Hatfield, Nicole, M., Treece Jacqueline, S. All these are full-time elementary and middle school teachers in Southern Illinois.

IV. SERVICE

Professional Organization membership

- Australasian Science Education Research Association (ASERA), 2020-present
- European Science Education Research Association (ESERA), 2017-present
- Nordic Education Research Association (NERA) 2022-present
- National Science Education Leadership Association (NSELA), 2015-present.
- National Association for Research in Science Teaching (NARST), 2004-present
- Zambia Association for Science Education (ZASE), 1993-present
- Southern African Association for Research in Mathematics Science and Technology Education (SAARMSTE), 1999-present.
- Virginia Association of Science Teachers, 2013-2019.
- American Chemical Society (ACS), 2001-2013
- Association of Teacher Educators (ATE), August 2010-2011
- American Education Research Association (AERA), 2006-2014
- Illinois Science Teachers Association (ISTA), 2002-2010
- Illinois Association for Chemistry Teachers (IACT), 2001-2005

Professional service

Editorial Board services

- Editor, Science Educator, 2025-present
- Co-Editor, Science Educator, 2017-2025
- Educational Researcher (2009-2011)
- Journal of computers in Journal of Computers in Mathematics and Science Teaching (JCMST) AACE Journal],
- International Journal of Environmental and Science Education.

Grants and Manuscripts Review Service

Grants reviewer

- National Science Foundation, Noyce program Track 1- 2015-present
- National Science Foundation, Early Career Program, Engineering Education and Centers division (EEC), 2016.

Manuscripts reviewer for Peer-reviewed Journals

- Science Education
- Research in Science Education
- Journal of Science Education and Technology
- School Science and Mathematics,
- Chemical Education Research and Practice (CERP)
- Journal of STEM Teacher Education,
- International Journal of Engineering Education,
- European Journal of Teacher Education,
- African Journal for Research in mathematics, Science and Technology Education.
- Exceptionality, 2013-2015
- Journal of Computers in Mathematics and Science Teaching.
- Journal of Science Teacher Education, *Guest reviewer*, 2017.
- Journal for Research in Science Teaching.
- Journal of Chemical Education

National and international Conferences proposal review service

- European Science Education Research Association
- Nordic Education Research Association
- National Association of Research in Science Teaching (NARST) conference
- Southern African Association for Research in Mathematics, Science and Technology Education Annual Conference
- Association of Science Teacher Educators (ASTE).
- American Educational Research Association (AERA) conference.

Service to National and International conferences

- Presider. European Science Education Research Association (ESERA) conference, Cappadocia, Turkey, Aug 29-Sept 1, 2023.
- Mumba (2022) (Presider). Southern African Association for Research in Mathematics, Science and Technology Education Annual Conference. South Africa.
- Mumba, F. (2016) (Presider). Strand 12: Educational Technology Online and Mobile Tools, Maryland Salon A. National Association of Research in Science Teaching (NARST) Annual International Conference. Baltimore, MD, USA. April 14 - 17, 2016.
- Mumba, F. (2016) (Chair). Boundary crossing, STEM industry engagement and communities of practice: Bridging the gap between theoretical science knowledge and its application in society. Australasian Science Education Research Association (ASERA) conference; University of Technology Sydney, Australia; June, 27-30, 2017.

Service to International institutions

- External Examiner of Masters theses (science education); Rhodes University, South Africa, 2025.
- External Examiner of Masters theses (science education); University of Namibia, 2025-present.
- External Examiner of PhD theses (science education); Copperbelt University, 2023-present.
- Reviews professor promotion Dossiers at Witwatersrand University, South Africa.
- External Examiner of science education PhD and MSc Theses; Witwatersrand University, Johannesburg, South Africa (2008-present).
- External Examiner of PhD theses (science education); University of Zambia, 2010-present.
- Reviews Researchers' rating at National Research Foundation (NRF); Pretoria, South Africa.

National Service

- Member of Fulbright Student Fellowship proposal review panel, Bureau of Educational and Cultural Affairs, Department of State,
- Science Educator Journal committee for NSELA (www.nsela.org); 2015-present.
- Member of National Science Education Leadership Association [NSELA]) Board; 2016-present
- Pearson, National Benchmark Panels for Physics Tests development and Evaluation

State Board of Education

- Member of Illinois State Board of Education (ISBE) Mathematics and Science Partnership Advisory Committee, 2005-2007.

Community Service

- Trained Election official in Albemarle County; 2016-present.

University Service

University of Virginia (2013-Present)

- Student Fulbright Fellowship Application Screening Committee, 2025.
- Search Committees for Organic/Biochemistry instructors, Chemistry Department, 2021, 2022, 2023, 2024 & 2025
- Search committee for Organic chemistry lab instructor- spring 2020
- Search committee for Organic chemistry lab instructor- summer 2019
- Search committee for Organic chemistry lecture- spring 2019
- Diversity committee in Engineering, spring 2019
- Internal Review Committee, Vice President for Research Office, 2017-2018.
- Member of Pan-University Institutes proposal review committee, 2017
- Member of search committee for Director of General Chemistry Labs, Chemistry Dept. summer 2016.

Southern Illinois University Carbondale (2005-2013)

- SIUC Tuition on-grants committee, 2012-2013.
- SIPAMS project planning and implementation committee, 2010-2013
- PIASCS project planning and implementation committee, 2010-2013
- SIUC Faculty Seed Grant Proposal Review Committee, 2008-2013
- Math and Science Project Planning Committee, (SMART program), July 2007-Dec 2008.
- Morris and Doctoral Fellowship Applications Review Committee, Graduate School, 2007
- Member of NCATE Committee, 2006-2007
- Heartland SIUC NSF GK-12 Ecological and Environmental Science Project Committee, 2006-2013
- MSSMED degree program development committee, 2007-2008.
- Teaching Excellence in Mathematics and Science (TEMS) scholarship committee, 2006-2013
- Search Committee for Assistant Professor of Mathematics Education, Department of Mathematics, 2008

School of Education and Human Development (2013-present)

- Rep for CISE Department on Diversity Action Committee (DAC)-2025-2026

- Rep for CISE Department on Faculty Council 2022-2023 (didn't complete term due to Fulbright fellowship).
- Internal Review committee for April Salerno's promotion to Associate Professor, Fall 2022
- Search committee for EDLF Dept Chair, spring 2019
- Internal Review committee for Jenifer Maeng's promotion to Associate Professor, Fall 2019
- Search committee for Curry post-award grant position, spring 2017
- Search committee for Curry post-award grant position, spring 2017
- Internal Review committee for Amanda Kibler's promotion to Associate Professor, Fall 2015
- Curriculum Review Committee, 2013-2016.

Departmental Service
CISE Dept. University of Virginia
- Director of UVa NSF Noyce Scholarship program, 2014-2022
- Coordinator of secondary science teacher program, 2013-present.
- Coordinator for Secondary Teacher Education Program 2014-2015.
- UVa NSF NOYCE Scholarship committee, 2013-present.
- Search committee for Professor of Special Education, Spring 2017
- Search committee for Assistant Professor of Special Education, Spring 2017
- Search committee for General methods faculty CISE department, spring 2016
- EDIS 7991 course review committee, 2014.
- Search committee for Assistant professor for research (Science Education), 2013.

C&I Dept. Southern Illinois University Carbondale
- General Chemistry Curriculum committee, Dept. of Chemistry & Biochemistry, 2010-2013
- Assessment Committee, Dept. of Chemistry & Biochemistry, 2010-2013
- C&I Highest Honors Secondary Education- Science, 2009-2013
- Reading and Literacy Assistant/Associate Professor Search Committee, 2008-2009
- Personnel Committee, Department of Curriculum, and Instruction, 2006-2008
- Search Committee, Mathematics Education Assistant Professor, Dept. of C&I 2007-2008
- Assistant to the Chair Search Committee, Department of C&I 2007-2008
- Chair of Department of Curriculum and Instruction, Search Committee, 2006
- Term & Adjunct faculty Search Committees, Department of C&I, 2005-2013
- Teaching Excellence in Mathematics and Science Scholarships committee, 2006-2012

HONORS, AWARDS & FELLOWSHIPS

2023-2024: **Fulbright US Scholar Award**, Institute of International Education (Bureau of Educational and Cultural Affairs), Fulbright award to Zambia for Academic year 2023-2024.

2021-2023: **Visiting Professor Fellowship**, Wits-Carnegie Diaspora Fellowship Program, Witwatersrand University, South Africa, 2021-2023.

2017 UVA School of Education Lasting Legacy Award (voted on by students).

2013: Outstanding Scholar Award, College of Education and Human Services, Southern Illinois University Carbondale.

2004: Outstanding Doctoral Student Award, Department of Curriculum and Instruction, Illinois State University.

2001-2005 Research Assistantship award, Illinois State University, Normal, IL.

1998-2001: Zambian and Belgian Governments' Cooperation Scholarship Award for Master's degree.

1989-1993: Zambian Government Scholarship award for undergraduate degree.