

JACINTA M. MUTAMBUKI

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HIGHLIGHTS

- Led professional development for science teaching assistants (TAs) in using active teaching strategies and formative classroom assessment techniques that lead to meaningful learning.
- Developed and disseminated professional development for science TAs in using active teaching strategies.
- Led chemistry demos in the Kalamazoo Community Museum, and middle and elementary public schools to create awareness of scientific literacy and the role of chemistry in the society.
- Integrated multiple teaching strategies, such as cooperative and collaborative group learning, learning through discovery, research, and inquiry based-learning to increase students' engagement and critical thinking in learning.
- Successfully synthesized gold nanoparticles and demonstrated their applications in the detection of organophosphorous pesticides at low concentration levels.
- Developed two new, and revised three inquiry-based integrated chemistry-biology laboratory experiments to emphasize the relevance of biology and chemistry concepts to students' daily lives, as well as the interdependence of chemistry and biology in the society for general chemistry course at Western Michigan University.
- Developed two inquiry-based integrated nanotechnology-chemistry modules for undergraduate quantitative analysis chemistry laboratory course at Western Michigan University.

EDUCATION

Western Michigan University

Ph.D. in Science Education/Chemistry

M.Sc. (*Chemical Education*)

Kalamazoo, MI

Expected June 2014

May 2010

University of Nairobi

B.Sc. (Science Education)

Concentration: Chemistry, Education & Mathematics

Nairobi, Kenya

2002 —2006

RESEARCH EXPERIENCE

- **Recipient of 2012—2013 The Mallinson Institute for Science Education Graduate Research Scholar Award** presented in each academic year by the Western Michigan University Graduate College to the graduate student with an excellent scholarly research work in each department.

July 2010—Present: Doctoral Student—The Mallinson Institute for Science Education, Western Michigan University (WMU)

- Pesticides are deleterious to human health. Exposure of pesticides to human may result in respiratory, myocardial and neuromuscular transmission impairment. It is exigent to develop novel methods of detecting pesticides at their lowest concentration possible.

- Developed pesticide sensors using gold nanoparticles, which can detect ethion, malathion, and fenthion organophosphorous (OP) pesticide concentrations below 1 ppt.
- Given its interdisciplinary nature and wide applications in modern society, nanotechnology can be a potential “context” in promoting positive student attitudes towards science learning while making the “abstract-taught” science concepts relevant to students, as well as acquainting them with the nanotechnology know-how.
 - Developed two inquiry-based integrated nanotechnology-chemistry modules for undergraduate quantitative analysis chemistry laboratory course at WMU.
 - Designed a mixed-methods study to investigate the impact of inquiry-based integrated nanotechnology-chemistry modules on students’ affective domain.

September 4, 2012—Spring 2013: Doctoral Research Associate- Science and Mathematics Program Improvement (SAMPI)

- Analyzed qualitative data on professional development for teachers conducted across Michigan.
- Used SPSS to analyze quantitative data.
- Assisted with data entry and data management.
- Assisted with the compilation of 2011-2012 and 2012-2013 Michigan Mathematics and Science Centers Annual reports for use by the Michigan Department of Education.

June 2011—2012: Doctoral Research Associate—The Mallinson Institute for Science Education, WMU

- Developed two inquiry-based integrated chemistry-biology laboratory units for undergraduate general chemistry laboratory courses.
- Revised three integrated chemistry-biology laboratory units to incorporate inquiry lines of learning in the general chemistry laboratory course.
- Developed materials such as reflection questionnaires on lessons, formative classroom assessment techniques, and active learning strategies for a six-weeks professional development held for chemistry and biology TAs.
- Designed a qualitative study to examine the impact of professional development on the TAs’ teaching practices.
- Conducted classroom observations and in-depth qualitative interviews with chemistry and biology TAs.
- Transcribed and analyzed qualitative data using hyperResearch software.

2008 —2010: Master of Science degree, Department of Chemistry, WMU

- Grading practice is of interest and importance not merely to the student himself, but also to parents, college administrators, bodies that award scholarships, professional and graduate schools, and potential employers. Grading practices may be influenced by the professors’ beliefs and values. Therefore, incorporating the beliefs and values that underlie an instructor’s choice of curriculum and pedagogy is imperative to achieving a curriculum design that can be competently and effectively disseminated.
 - Conducted a qualitative study to examine if chemistry faculty beliefs about what should be shown on student written solutions in problem-solving are consistent with their grading practices.

TEACHING AND MENTORING EXPERIENCE

Western Michigan University, Kalamazoo, MI

- **Recipient of 2009—2010 All-University Graduate Teaching Effectiveness Award**, presented by the WMU graduate college to only seven best graduate teaching assistants of the year in the entire university.
- **Recipient of 2009—2010 Graduate Teaching Excellence Award**, presented by the chemistry department to the best two graduate teaching assistants of the year.

Spring 2008 – present: Graduate Teaching Assistant

- Taught an online chemistry course for science educators at the Master's level.
- Managed and taught inquiry-based Physical Science Course for Elementary Pre-service teachers.
 - Assisted with the development of lesson units for the pre-service teachers.
 - Engaged students by allowing them the opportunity to design experiments on their own.
 - Designed test items for quizzes, homework, and final exams.
 - Graded students' work and computed their final grades.
 - Formulated topics for end-of-semester student investigation research projects.
 - Utilized formative assessment techniques such as Think-Pair-Share, muddiest points, application cards, and "exit-pass" to gauge student progress in the learning.
- Taught General Chemistry I, Introduction to Organic Chemistry I, Chemistry for health professionals I & II laboratory courses.
 - Implemented inquiry-based learning in addition to hands-on activities to increase student engagement and critical thinking skills.
 - Made recommendations on laboratory requirements and improvement of the experimental procedures.
 - Invented the use of post-lab debriefings/closure to address students' misconceptions, which might not have been fully addressed during hands-on activities.
 - Helped in setting up midterm and final lab exams.
 - Supervised and conducted laboratory experiments.
 - Graded students' lab reports and conducted laboratory equipment clean up.

Mavoko High School, Athi—River, Kenya,

June—December 2006: Teacher Intern

- Taught Chemistry and Mathematics.
 - Instructed and assessed 10th graders in Mathematics and Chemistry.
 - Incorporated cooperative learning groups with clearly defined roles to assist students with learning disabilities.
 - Implemented various teaching strategies including learning through inquiry and hands-on learning to motivate and increase student engagement.
 - Utilized individual daily behavior charts to assist students in making positive choices.

RELATED EXPERIENCE

- Involved in conducting chemistry demos for Elementary students in Kalamazoo museum and public middle-and elementary schools to help and motivate them in understanding the adventures in chemistry, as well as develop positive attitude toward science, *April 2010—Present*.
- Participated as a timekeeper in Science Bowl during the 39th NOBCChE National Conference, *September 25th-28th 2012*, Washington, DC.
- Participated as a timekeeper in Science Bowl during the 38th NOBCChE National Conference, *April 2011*, Houston, Texas.
- Participated as a judge in Science Bowl during the 37th NOBCChE National Conference, *March 2010*, Atlanta, GA.
- Collaborated with Department of Assessment, Western Michigan University, in developing a rubric for assessing research related to assessment, *2009 - 2010*.
- Managed and prepared equipment for teachers in Science is the Way to Go Project, for testing the effectiveness of inquiry based teaching on 8th graders, Western Michigan University, *2008 - 2010*.

RECOGNITION AND AWARDS

- 2012-2013 Departmental Graduate Research Scholar Award, Graduate College, WMU
- 2012-2013 Recognized among the top 25 students recommended for the competitive Professor K. Patricia Cross Future leaders Award
- 2013 Western Michigan University Campus Associate— *Association of American Colleges and Universities (AACU)*
- 2013, 2012, 2011, and 2010 Advancing Science Award Recipient, NOBCChE
- 2012 Graduate Research and Creative Activities Poster Award, WMU
- 2009-2010 All-University Graduate Teaching Effectiveness Award, WMU
- 2009-2010 Graduate Teaching Excellence Award, Department of Chemistry, WMU
- 2009-2010 Impacting Communities by Advancing Chemistry Award, WMU
- 2009-2010 Rubric Competition for Research Related Assessment Award, WMU
- 2011 NOBCChE Excellence Service Award, Houston, TX
- 2010 NOBCChE Excellence Service Award, Atlanta, Georgia

LEADERSHIP AND AFFILIATION

- **Doctoral Research Associate** — WMU, *Fall 2011- Spring 2012*
 - Led professional development training for chemistry and biology teaching assistants.
 - Developed and disseminated materials for professional development held for chemistry and biology teaching assistants.
- **Vice-president** — NOBCChE Student Chapter, WMU, *Spring 2012-2013*
 - Presided overall organizational meetings in the absence of the President.
 - Oversaw all chapter activities.
 - Represented *NOBCChE Student Chapter* at WMU and during *the Kalamazoo American Chemical Society (KACS) events*.
 - Trained the chapter members and chemistry TAs on the use of active teaching strategies geared towards improving undergraduate science instruction, as well as preparing them to be competent future faculty.

- **Secretary** — NOBCCChE Student Chapter, WMU, 2010 - 2013
 - Compiled chapter minutes from general meetings.
 - Scheduled chapter general meetings.
 - Maintained communication with chapter members.
 - Maintained the list of active members.
 - Organized nomination of chapter officials.
- **Member** — NOBCCChE, 2009 - Present
 - Developed lesson plans for chemistry demos conducted in Kalamazoo Elementary schools and Kalamazoo Museum Day in Kalamazoo, Michigan.
 - Volunteered as a judge for Science Bowl at national conference level.
 - Volunteered as a timekeeper for Science Bowl at national conference level.
- **Member**—National Association for Research in Science Teaching (NARST), 2009 - Present

PUBLICATIONS AND PRESENTATIONS

- **Jacinta Mutambuki** and Herb Fynewever, Comparing chemistry faculty beliefs about grading with grading practices. *J. Chem. Educ.*, **2012**, 89, 326-334.
- Heather L. Petcovic, Herb Fynewever, Charles Henderson, **Jacinta M. Mutambuki**, and Jeffrey A. Barney, Faculty Grading of Quantitative Problems: A Mismatch between Values and Practice. *Res. Sci. Ed.*, **2013**, 43, 437-455.
- **Jacinta M. Mutambuki** and Renee Schwartz, Graduate Teaching Assistants and Inquiry-Based Integrated Chemistry-Biology Laboratory Units: The Impact of Extended Professional Development (*Manuscript submitted*).
- Lloyd Mataka, **Jacinta M. Mutambuki**, Bill Cobern, George Akom, Megan Grunert, The effect of a general explicit problem-solving on pre-service elementary teachers' ability to solve heat transfer problem (*Manuscript submitted*).
- **Jacinta M. Mutambuki** and Renee Schwartz, The journey of a chemistry graduate teaching assistant in teaching inquiry-based integrated science curriculum: What an extended Professional development can do (*Manuscript in preparation*).
- Renee Schwartz, John Geiser, **Jacinta Mutambuki**, Len Ginsberg, Don Schreiber, Bob Ruhf, Engaging STEM Students from the Beginning: An Interdisciplinary Approach to Introductory Biology and Chemistry Laboratories (*Manuscript in preparation*).
- **Jacinta M. Mutambuki**, Sherine Obare, Herb Fynewever, Bill Cobern, Kevin Douglass, Andre Venter, Integrating Nanotechnology into Undergraduate Analytical Chemistry Laboratory Course: The impact on Students' Affective Domain (*Manuscript in preparation*).
- **Jacinta M. Mutambuki** and Renee Schwartz, Science graduate teaching assistants and inquiry-based integrated chemistry-biology laboratory units: The impact of professional development. An oral presentation at the 86th Annual NARST Conference, April 5-10, **2013**; Rio Grande, Puerto Rico.
- **Jacinta M. Mutambuki** and Renee Schwartz, Graduate Teaching Assistants' Experiences and Challenges in Teaching Inquiry-Based Integrated Chemistry-Biology Laboratory Units: The Impact of Professional Development, Poster presentation at the 39th NOBCCChE National Conference, September 25-29, **2012**; Washington, DC.
- **Jacinta M. Mutambuki**, Heather Pectovic, Herb Fynewever, Charles Henderson, and Jeffrey Barney, Faculty beliefs and grading practices on problem-solving across chemistry, physics, and Earth science disciplines, Poster presentation at 38th NOBCCChE National Conference, April 19-22, **2011**; Houston, TX.

- **Jacinta M. Mutambuki** and Herb Fynewever, Sending mixed messages: Professors who ask students to show their work and penalize them when they do: Poster presentation at 37th NOBCCChE National Conference, March **2010**, Atlanta, GA.
- Heather L. Petcovic, Herb Fynewever, Charles Henderson, **Jacinta M. Mutambuki**, and Jeffrey A. Barney, Faculty grading of quantitative problems: Are Values Consistent with Practice? Poster presentation at 2010 NARST Conference, March **2010**, Philadelphia, PA.

LANGUAGES

- Fluent in English, Swahili, and Kikamba.

REFERENCES

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