

Naumih M. Noah (PhD)

Chemistry Department, Kenyatta University,
P.O Box 43844-00100, Nairobi, Kenya.

Career Objective

Research on Bioanalytical chemistry focusing on development and validation of biosensors for the detection of infectious diseases and integration of nanotechnology and health care in developing countries.

Education:

- ❖ PhD, State University of New York at Binghamton, May, 2012.
Dissertation title: New Concepts in Pain Detection and Management using Biochemical Principles.
Research Advisor: Professor O.A Sadik, Email: oadik@binghamton.edu
Department of Chemistry, Binghamton University
<http://www2.binghamton.edu/chemistry/people/sadik/sadik.html>

- ❖ MSc, University of the Ryukyus, Okinawa, Japan. Analytical Chemistry, 2006
Thesis title: Evaluation of Heavy metal pollution on the coastal marine environments of Okinawa Island, Okinawa, Japan
Research Advisor: Prof Oomori Tamotsu

- ❖ BSc, University of Nairobi, Chemistry Major, 2002 (First Class Honors)

Specific Achievements

- Awarded an award for the outstanding poster contribution at the Science to Technology Day held at Binghamton University on April, 27th, 2012.
- Awarded the Binghamton University Graduate excellence award in research on March 20th, 2012.

- Have authored/co-authored seven peer reviewed papers in reputable journals (*Electroanalysis, Clinica Chimica Acta, Analytical Biochemistry and Reproductive Biology and Endocrinology*)
- Developed an undergraduate laboratory on “Environmental Nanotechnology” where the students learned how to synthesize and use palladium nanoparticles in the conversion of Chromium (VI) to Chromium (III).
- Used HPLC, MS, IC and NMR techniques in characterization of a newly synthesized subclass of phosphorylated flavonoid derivatives. The flavonoids derivatives were found to have enhanced aqueous solubility of about 2000 fold as compared to the parent molecules.
- Developed and validated three immunosensors for detection of Cyclooxygenase-2 (COX-2) and inducible Nitric Oxide Synthase (iNOS), pain and cancer biomarkers. The principle of detection was based on the interaction of the enzymes and their antibodies. The detection limits were in the 10^{-4} ng/mL which was 4 orders of magnitude lower than that reported for ELISA.
- Investigated the synthesized flavonoid derivatives as potential Cyclooxygenase-2 (COX-2) and inducible nitric oxide synthase (iNOS) inhibitors using prostaglandin E2 and nitrite assays and obtained up to 95% inhibitions.
- Used Surface Plasmon Resonance (SPR) to determine the binding constant of COX-2 and iNOS
- Used ELISA technique to develop immunoassays based on antibody antigen interaction to determine the viability of the interaction between COX-2 and iNOS enzymes with their antibodies.
- Used electrochemical techniques such as cyclic voltammetry to develop and validate immunosensors for the detection of COX-2 and iNOS. Detection limits obtained were 4 orders of magnitude lower than that reported for ELISA
- Performed synthesis and characterization of polyamic acid (PAA) for biomolecules immobilization and demonstrated that PAA can act as a template for the immobilization of biomolecules leading to signal amplification.
- Been successful in conducting independent research, writing technical reports, and peer reviewed articles. Presented my research in international conferences such as Pittcon as well as in regional, national and local University internal workshops.

- Demonstrated strong leadership and team work skills by mentoring six undergraduate students with whom we have published our work together and two of them graduated with honors thesis.

Analytical Chemistry Skills

- High Performance Liquid Chromatography -Mass Spectrometry (LC-MS)
- Surface Plasmon Resonance (SPR)
- Ion Chromatography (IC)
- Flash Chromatography
- Quartz Crystal Microbalance (QCM)
- Electrochemical methods such as Cyclic voltammetry(CV), differential pulse voltammetry (DPV) and square wave voltammetry (SWV)
- Ultra violet and visible spectroscopy (UV/Vis).
- Enzyme Linked Immunosorbent Assay (ELISA)
- Cell culture and cell based assays
- Wet chemistry

Computer Skills

- MS Office: word, Excel, power point and Access
- ChemDraw for drawing chemical structures
- Endnote for article writing and publishing
- Dionex Chromeleon for HPLC
- ESPRIT software for SPR

Professional Experience:

- 1) Visiting Research Fellow, University of the Western Cape, South Africa, Sensor Lab, Chemistry Department, 1st to 23rd May, 2011
 - Synthesized and characterized polyamic acid (PAA) for biomolecules immobilization and signal amplification
 - Used amperometric and impedance electrochemical techniques to develop an immunosensor using a modified PAA for biomolecules immobilization and signal amplification.

- 2) August 2010 to present. Research assistant. State University of New York at Binghamton, Harpur College of Arts and Sciences, Chemistry (Prof. Sadik's research lab).
 - Developed and validated three immunosensor for the detection of COX-2 and iNOS, pain and cancer biomarkers
 - Worked with HPLC, MS, flash chromatography, ion chromatography, SPR and electrochemical techniques in the development of the immunosensors
 - Wrote research summary reports and presented the findings to my research advisor every week
 - Mentored and trained six undergraduate students whom we have published work together.
- 3) 2009-2010, Teaching assistant, State University of New York at Binghamton, Harpur College of Arts and Sciences,(Analytical chemistry and Instrumental analysis laboratory course to undergraduate students)
- 4) 2008-2009, Teaching assistant, State University of New York at Binghamton, Harpur College of Arts and Sciences, (Organic chemistry)
- 5) 2007-2008, Teaching assistant, State University of New York at Binghamton, Harpur College of Arts and Sciences, (General Chemistry)
- 6) February – July, 2007, Research Assistant, University of Nairobi, College of Biological and Physical Sciences, Chemistry. (Dr Kituyi's Lab)
 - Literature search on pollution from motor vehicles
 - Assisted in the development of a proposal for the establishment of a centre of excellence at the University of Nairobi, Chiromo Campus, Kenya. Funded by VOLVO, Switzerland.
 - Organized travel and accommodations of collaborators from Uganda, Senegal, Switzerland and Ethiopia.
- 7) 2002-2003, Research Assistant, University of Nairobi, College of Biological and Physical Sciences, Chemistry (Dr D.K Kariuki, Analysis of soil permeability).

Publications:

- 1) **Naumih M Noah**, Marcellus Omole, Anas Almaletti, Jae Lim, Omowunmi A. Sadik, (2011). Metal Enhanced Electrochemical Cyclooxygenase-2 (COX-2) Sensor for Biological Applications, *Electroanalysis*, 23(10) 2392-2399.
- 2) **Naumih M Noah**, Samuel K. Mwilu, Omowunmi A. Sadik, Alim A. Fatah, Richard D. Arcilesi (2011). Immunosensors for quantifying Cyclooxygenase 2 pain biomarkers, *Clinica Chimica Acta*, 412(15-16)1391-1398.
- 3) **Naumih M Noah**, Saamia Alam, Omowunmi A. Sadik (2011). Detection of inducible nitric oxide synthase using a suite of electrochemical, fluorescence, and surface plasmon resonance biosensors, *Analytical Biochemistry*, 413(2)157-163.
- 4) Elizabeth Osibote, **Naumih Noah**, Omowunmi Sadik, Dennis McGee, Modupe Ogunlesi (2011). Electrochemical sensors, MTT and immunofluorescence assays for monitoring the proliferation effects of cissus populnea extracts on Sertoli cells, *Reproductive Biology and Endocrinology*, 9(1)65.
- 5) Marcellus A. Omole, **Naumih M.Noah**, Lisa Zhou, Anas Almaletti, Omowunmi A Sadik, Helen N. Asemota, Elvira S William, Jason Gilchrist (2009). Spectroelectrochemical characterization of pain biomarkers, *Analytical Biochemistry*, 395(1)54-60.
- 6) M. A Sheikh, **N. M Noah**, K. Tsuha, T. Oomori (2007). Occurrence of tributyltin compounds and characteristics of heavy metals in sediments from Tanzania, *Int. J. Environ on. Sci. Tech*, 4(1)49-59.
- 7) **Naumih M Noah**, Tamotsu Oomori (2006). Evaluation of Heavy metal pollution on the coastal marine environments of Okinawa Island, Japan., *Bulletin Faculty of Science, University of the Ryukyus*, 81, 93-104.

Presentations at conferences

- 1) **Naumih M Noah**, Saamia Alam, Omowunmi A. Sadik (2011) Oral Presentation on the Detection of Inducible Nitric Oxide Synthase using a suite of electrochemical, fluorescence and surface Plasmon resonance biosensors., Pittcon, Atlanta, Georgia, Unpublished
- 2) **Naumih M Noah**, Samuel K. Mwilu, Omowunmi A. Sadik (2010) Poster presentation on SPR and Capillary Immunosensors for Characterization of Cyclooxygenase-2, a major Pain, Pittcon, Orlando, Florida, Unpublished

- 3) **Naumih M Noah**, Marcells Omole, Omowunmi A. Sadik (2009) Oral Presentation on the Development of a Pain Biosensor using Metal-enhanced Electrochemical Detection., Pittcon, Chicago, Illinois, Unpublished
- 4) **Naumih M Noah** and Omowunmi Sadik. September, 2008. Binghamton University, Chemistry Department Colloquium. Oral Presentation on *Development of a Pain Biosensor*
- 5) **Naumih M Noah** and Omowunmi Sadik. September, 2009. Binghamton University, Chemistry Department Colloquium. Oral Presentation on *Biosensors as Tools for Monitoring Pain biomarkers*
- 6) **Naumih M Noah**, Samuel Mwilu and Omowunmi Sadik. September, 2010. Binghamton University, Chemistry department Colloquium. Poster presentation *SPR and Capillary biosensors for COX-2*
- 7) **Naumih M Noah**, Tamotsu Oomori (2005) Poster presentation on the Evaluation of Heavy metal pollution on the coastal marine environments of Okinawa Island, Japan., Annual meeting of the Geochemical Society of Japan. Unpublished

Honors and Awards

- March 20th, 2012, Graduate Excellence in research award by the Graduate school of the State University of New York at Binghamton.
- May, 2011, Research Travel award from the United States National Science foundation (US NSF) grant to travel to the University of Western Cape, South Africa to visit research collaborators.
- 2008-2010, Graduate Fellowship, Chemistry Department, State University of New York at Binghamton, State University of New York at Binghamton, Awarded a graduate fellowship during the summers (June - August) of 2008, 2009 and 2010 to do research towards my Doctoral studies
- 2004-2006, Japanese Government Scholarship, Japanese Government, University of the Ryukyus, Awarded a Japanese Government scholarship to study towards a master's degree in analytical Chemistry.

Students Supervised

Saamia Alam (BSc Honors Thesis), Kavita Sign, Ryan Witham, Anas Almalleti (BSc Honors Thesis), Jae Lim. Naomi Addane, Bridging student, summer 2010

Membership Information:

- Member: American Chemical Society
- Member: Kenya Chemical Society

Community Service

- Volunteered in Science Olympiad 2008, 2009, 2010 and 2011 held at SUNY-Binghamton, New York
- Secretary- Graduate African Student Organization (GASO), SUNY-Binghamton, 2008-2009

Graduate Research

PhD Research at Binghamton University (Under Prof O.A Sadik)

My PhD research is specialized in Bioanalytical chemistry focusing on characterization of Pain and Cancer biomarkers. Current pain assessment methods are very subjective and have been found to be ineffective. Thus, in my research we focus on the development of objective methods which can be used to assess pain based on the biochemical mechanism of pain. In this regard, we have developed different biosensors for the detection of Cyclooxygenase -2 (COX-2) and inducible nitric oxide synthase (iNOS) which are the major pain and cancer biomarkers. My research also involves structural modification of flavonoids to more soluble derivatives which have been tested as potential Pain and Cancer drugs in *invitro* studies. I have developed an undergraduate laboratory where the students learned how to synthesize and use palladium nanoparticles in the conversion of Chromium (VI) to Chromium (III). I have extensive experience in different analytical techniques. Other duties apart from research in our group involves mentoring and training undergraduate and bridging student on different instrumentation as well as maintaining lab safety.

Masters Research at the University of the Ryukyus, Okinawa Japan (Under Prof Oomori Tamotsu)

My master's research was on the evaluation of heavy metal pollution on the coastal marine environments of Okinawa Island, Japan. The distribution of heavy metals was investigated using a sequential extraction procedure to determine the chemical state of the heavy metals in sediment samples. The results obtained were indicative of the contribution of heavy metal pollution in the marine environments of Okinawa Island.

Referees

1. Prof. Omowunmi A Sadik

Research Advisor

Chemistry department,

State University of New York at Binghamton

Phone: 607-777-4132

Email: osadik@binghamton.edu

2. Dr. Catherine N. Malele

Lecturer,

Chemistry Department,

Binghamton University,

Binghamton, NY 13902,

Phone: 607-427-4699

Email: cmalele1@binghamton.edu

3. Dr. Dickson Andala,

Lecturer,

Chemistry Department,

Kenyatta University

P.O Box 43844-00100

Nairobi, Kenya

Phone: 0705204610

Email: andala.dickson@ku.ac.ke