

Putuma P. Gqamana

http://www.chem.purdue.edu/hilkka/putuma_gqamana.htm

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Work Address

Purdue University
Department of Chemistry
560 Oval Drive, Box 439
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Career Objective: To obtain a position as a research scientist, preferably in interdisciplinary research, (i) within the chemical industry, or (ii) for the government or (iii) a privately owned research institution.

Education:

Purdue University, West Lafayette, Indiana

Ph.D. candidate in the Department of Chemistry, 2002-present

Specialization: Analytical Chemistry, Physical Organic Chemistry, Mass Spectrometry

Hampton University, Hampton, Virginia

Master of Science in Chemistry, 1997 – 2001

Specialization: Physical Chemistry, Surface Chemistry, Environmental Chemistry

Bachelor of Science in Chemistry, 1996 – 1997

Port Elizabeth Technikon, P.E. South Africa (S.A.)

National Higher Diploma in the Department of Chemistry, 1992

Peninsula Technikon, Bellville, S. A.

National Diploma in Analytical Chemistry, 1989 – 1991

Professional Experience:

(A) Purdue University, West Lafayette, Indiana (August 2002 – to date).

(i) Research Assistant

Developed an FT-ICR mass spectrometric method for the analysis of hydrocarbon mixtures and pyrolysis products.

Contributed to the development of a Laser induced Acoustic Desorption (LIAD)/ Chemical Ionization (CI) mass spectrometric method for the analysis of hydrocarbon mixtures and polyethylenes in an FT-ICR instrument.

Contributed to the development and installation of a high-power LIAD probe for the evaporation of nonvolatile samples into an FT-ICR instrument.

Improved a LIAD/CI mass spectrometric method for the analysis of low molecular weight polyisobutenyl succinic anhydride (PIBSA) and polyisobutenyl phenol (PIBP) polymers in an FT-ICR instrument using the high-power LIAD probe.

Developed a novel CI method for the FT-ICR mass spectrometric analysis of small nonpolar hydrocarbons based on $\text{CpCo}(\text{CO})^{+}$ reagent.

Developed a novel CI method for the FT-ICR mass spectrometric analysis of low MW polyisobutylene (PIB) oligomers using organometallic CI agents.

Explored the gas-phase reactivity of $\text{CIMn}(\text{H}_2\text{O})^{+}$ towards several polar organic molecules in the FT-ICR.

(ii) Teaching Assistant

Advised undergraduate chemistry students for CHM111(non-technical majors), CHM115 and CHM116 (technical and engineering) and CHM124 (honors students) during a weekly one hour recitation and weekly office hours.

Taught various laboratory sections for undergraduate introductory chemistry courses (see above).

Proctored exams and graded quizzes, laboratory reports and class assignments.

(B) Hampton University, Hampton, VA. (August 1997-December 1999).

Research Assistant

Discovered the effect of the use of humic acid /mineral oxide composites in the sorption of aqueous Pb^{+2} , Cd^{+2} and Zn^{+2} pollutants.

(C) Border Technikon, East London, South Africa (1993-2002).

Lecturer

Designed syllabi, lab manuals and instruction materials for undergraduate courses in general chemistry, physical chemistry and analytical chemistry.

Lectured classes for undergraduate general chemistry, physical chemistry and analytical chemistry
Proctored exams, graded quizzes, laboratory reports, assignments and major exams for undergraduate general chemistry, physical chemistry and analytical chemistry courses.

Ordered and purchased laboratory and teaching equipment and accessories.

(D) ESKOM Technology Services, Johannesburg, S.A. (1992-1993)

(i) Senior analytical chemistry technician.

Explored a direct injection method for the gas chromatographic method for the analysis of dissolved gas in mineral insulating oils.

(ii) Matla and Kriel Power Stations, Mpumalanga Province, S.A. 1991.

Technician intern

Contributed to the monitoring of online water treatment facilities and the demineralized water train in the generator transformers.

Performed wet and instrumental methods of analysis for water samples at different sampling points from the Vaal River, inlets and reservoirs, to all the major output lines of the water system for the municipalities of Kriel and Matla.

Performed coal and mineral transformer oil analysis using classical and modern methods of analysis.

(E) Rhone-Poulenc Rorer, Port Elizabeth, 1990.

Technician intern

Performed analysis of production line pharmaceutical drugs using modern methods of analysis.

Publications:

"Analysis of Polyethylene by Using Cyclopentadienyl Cobalt Chemical Ionization Combined with Laser-Induced Acoustic Desorption / Fourier Transform Ion Cyclotron Resonance Mass Spectrometry". J. Larry Campbell, Marc N. Fiddler, Kenroy E. Crawford, **Putuma P. Gqamana**, and Hilikka I. Kenttämää. *Anal. Chem.* **2005**, *77*, 4020-4026.

"Application of a High Power Laser-induced Acoustic Desorption (LIAD) Probe for the Mass Spectrometric Analysis of Biological Compounds, Hydrocarbon Polymers and Petroleum Distillates." Ryan C. Shea, **Putuma P. Gqamana**, Linan Yang, Penggao Duan, Steven C. Habicht, Jin Zhicheng, Marc N. Fiddler, Michael J. Yurkovich, Weldon E. Vaughn, Kuangnan Qian, David J. Aaserud, and Hilikka I. Kenttämää. *Manuscript in preparation.*

"Analysis of Hydrocarbons Produced from the Pyrolyses of Arenesulfonate Esters by Cyclopentadienylcobalt Radical Cation Chemical Ionization Fourier Transform Ion Cyclotron Resonance Mass Spectrometry". **Putuma P. Gqamana**, J. Larry Campbell, Kate P. Williams, John J. Nash and Hilikka I. Kenttämää. *Manuscript in preparation.*

"Exploring Laser induced Acoustic Desorption and Chemical Ionization Strategies towards the Mass Spectrometric Analysis of Underivatized Polyisobutylenes. **Putuma P. Gqamana**, David J. Aaserud, Hilikka I. Kenttämää. *Manuscript in preparation.*

"Gas-Phase Reactions of Aquachloromanganese(II) cation ($\text{ClMn}(\text{H}_2\text{O}^+)$) with Organic Compounds in a Fourier-transform Ion Cyclotron Resonance (FT-ICR) Mass Spectrometer. **Putuma P. Gqamana**, Penggao Duan, Mingkun Fu and Hilikka I. Kenttämää. *Manuscript in preparation.*

Awards:

Dean's List, Hampton University, 1996 - 1997

USAID African Training Leadership Advancement Studies (ATLAS) Award, 1996-2000

Trust for Education and Advancement in South Africa (TEASA) Award, 1992

Johnson and Johnson's Leadership Education and Advancement (LEAD) Project Award, 1986-1991

Presentations: Oral Presentations:

"Laser-induced Acoustic Desorption / Chemical Ionization (LIAD/CI) Strategies towards Mass Spectrometric Analysis of Underivatized Polyisobutylenes." **Putuma P. Gqamana**, Penggao Duan, Mingkun Fu, Marc N. Fiddler, J. Larry Campbell, David Aaserud and H.I. Kenttämää. 55th ASMS Conference on Mass Spectrometry and Allied Topics. Indianapolis, IN, USA. **2007**.

Poster Presentations:

"Analysis of Low Molecular Weight Polyisobutylenes by Laser-induced Acoustic Desorption (LIAD) coupled with Chemical Ionization in a Fourier Transform Ion Cyclotron Resonance Mass Spectrometer (FT-ICR)". **Putuma P. Gqamana**, Ryan C. Shea, Marc N. Fiddler, David Aaserud, Hilikka I. Kenttämää. 54th ASMS Conference on Mass Spectrometry and Allied Topics. Seattle, WA, USA. **2006**.

"Examination of the Reactivity of the Cyclopentadienyl Cobalt Radical Cation with Cyclic Hydrocarbons Using Fourier Transform Ion Cyclotron Resonance Mass Spectrometry: Application for the Identification of Hydrocarbons Produced from Pyrolyses of Benzenesulfonate Esters". **Putuma P. Gqamana**, J. Larry Campbell, Kate P. Williams, John J. Nash and Hilikka I. Kenttämää. 51st ASMS Conference on Mass Spectrometry and Allied Topics. Montreal, Canada. **2003**.

Professional Membership:

American Chemical Society (ACS) since 1999.
American Society of Mass Spectrometry (ASMS) since 2002.
Phi Lambda Upsilon (PLU) Graduate Student Chemistry Society – Purdue University Chapter since 2002.
National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE) – Purdue University Chapter since 2002.

Other Professional Skills:

Computational:

Gaussian 03 Suite of Programmes (G03) for *ab initio* calculations on Windows or Linux processors; Amsterdam Density Functional programme (ADF) for DFT calculations especially suited for organometallics and solid state calculations; GROMACS for MD simulations; Monte-Carlo calculations; Mathcad 2001 and GraphPad Software for data analysis and graphing.

Chemistry Instrumentation:

Mass Spectrometry, e.g., FT-ICR (Extrel and Finnigan 3T with Odyssey 5.0 Data System and IonSpec Data System), TSQ 700, Thermo LTQ; Applied Biosystems/MDS Sciex 4000 MALDI-TOF-TOF, Chromatography, e.g., GC, HPLC, CE and IC; Spectroscopy, e.g. NMR, UV-Vis, FTIR, XRF, GFAS, ICP-AES, AAS; and electrochemical methods, e.g. voltammetry, potentiometry, coulometry (mostly BASi models); thermal methods of analysis, e.g., TGA and DSC, Combustion methods and calorimetry, e.g., bomb calorimetry.

Referees:

Prof. H.I. Kenttämää – Thesis advisor: <http://www.chem.purdue.edu/hilkka/HK.htm>
Prof. R.G. Cooks – <http://www.chem.purdue.edu/people/faculty/faculty.asp?itemID=1>
Prof. S. Kais – <http://www.chem.purdue.edu/people/faculty/faculty.asp?itemID=38>