

## **Michael Gyamerah, Ph.D.**

Associate Professor

Department of Chemical Engineering

Prairie View A&M University

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### **ACADEMIC BACKGROUND**

- B.S., Chemical Engineering, University of Science & Technology, Kumasi, Ghana, 1977
- Ph.D., Biochemical Engineering, Loughborough University, United Kingdom, 1984
- Post-doc. fellow, Applied Microbiology/Biotechnology, Norwegian University of Science & Technology, Trondheim, Norway, 1988 -1990

### **PROFESSIONAL BACKGROUND**

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| 2007 - Present | Associate Professor, Department of Chemical Engineering, Prairie View A&M University, Prairie View, Texas   |
| 2001 –2007     | Assistant Professor, Department of Chemical Engineering, Prairie View A&M University, Prairie View, Texas   |
| 2000 – 2001    | Research Associate (Biocatalysis), Department of Chemistry, Michigan State University, East Lansing, Michigan   |
| 1999 - 2000    | Research Associate (Bio-processing), Department of Chemical Engineering, University of Waterloo, Waterloo, Canada   |
| 1997 –1998     | Consultant (Bio-processing), Nkulenu Industries Limited, Ghana  |
| 1993 – 1996    | Research Fellow (Biocatalysis), Department of Biological Sciences, University of Exeter, Exeter, United Kingdom   |
| 1992 - 1993    | Visiting Research Fellow (Bio-processing), Department of Chemical Engineering, Loughborough University of Technology, England   |
| 1988 –1992     | SINTEF Research Biotechnologist & NTNF Postdoctoral Fellow (Bio-processing), Department of Biotechnology, Norwegian University of Science & Technology, Trondheim, Norway |
| 1984 – 1988    | Lecturer (Industrial Chemistry & Fermentation Technology), University of Ghana, Accra, Ghana  |

### **PROFESSIONAL ACTIVITIES**

1. Kinetics of biomass pyrolysis and conversion into bio-oil, and characterization, stabilization and development of catalytic conversion processes for upgrading bio-oil (pyrolysis oil) to transportation fuels
2. Ethanolic fermentation of biomass hydrolysates using recombinant *Zymomonas mobilis*
3. Kinetics and process development of lipase and microbial catalyzed production of biodiesel by transesterification of vegetable oils and bioethanol
4. Solvent tolerant recombinant microbial biocatalysts for aryl oxidations in biphasic media
5. Bioprocessing strategies for improving productivity of filamentous microbial fermentations involving the development a general protocol for the cultivation of filamentous fungi to

achieve low viscosity fermentation broths that reduce protease production to minimize heterologous protein product degradation

6. Reviewer of manuscript for the American Chemical Society (ACS) Journal Industrial & Engineering Chemistry Research (June 2011)
7. Served as External Examiner for a Ph.D. Thesis in biotechnology at the University of Madras, Chepauk, India (June – July 2011)
8. Reviewer of USDA/NIFA/SBIR grant proposals (February 2013)
9. Reviewer of manuscript for the African Journal of Biotechnology (November 2014)
10. Reviewer of manuscript for the journal Process Biochemistry (January 2015)
11. Reviewer of manuscript for the Journal of Biotechnology (February 2015)

### **GRANTS AND CONTRACTS (partial list of total worth \$6.8 million)**

\$1 million being part of the \$16 million NSF Synthetic Biology Engineering Research Center (SynBERC) award as co-PI of team from PVAMU with Dr. Raul Cuero as PI, an affiliated outreach institution with University of California, Berkeley as lead Institution, and Massachusetts Institute of Technology, Cambridge, MA, University of California, San Francisco, CA and Harvard University, Cambridge, MA as Core Partner Institutions. September 2007 – December 2008. My contribution is one calendar month a year for this project, and my share of the funding may be estimated as \$142,857.42

\$465,000 as co-PI of the project “Institutional Integration of nanotechnology into engineering and science curricula by enhanced sequential approaches” funded by the Department of Education (DoE) through the “minority science and engineering improvement program”. September 2009 – September 2013. My contribution is one calendar month per year and share of the funding may be estimated as \$77,500.00

\$5 million for the NSF CREST Center for Energy and Environmental Sustainability (CEES) at PVAMU as the investigator responsible for research on bio-oil characterization, stabilization and catalytic upgrading of the bio-oil to transportation fuel and optimization of fuel grade bio-ethanol production by fermentation of sugars from ionic-liquids catalyzed hydrolysis of biomass. September 2010 – August 2015. My contribution is 2 calendar months per year and share of the grant is estimated as \$493,827.16 for the five years.

\$20,000 as PI of the Prairie View A & M University Research Summer Mini-Grant for research on extraction and characterization of triglycerides from non-edible seeds and kinetics of the lipase-catalyzed triglycerides for biodiesel production. June 1 – August 31, 2015.

### **PUBLICATIONS**

#### ***Peer Reviewed Journal Articles (5-7 most recent)***

Paul O. Biney, **Michael Gyamerah**, Jiacheng Shen, Bruna Menezes (2015) Kinetics of pyrolysis of arundo, sawdust, corn stover and switch grass by thermogravimetric analysis using a multi-stage model. *Bioresource Technology* 179: 113 – 122

McIver AM, Janardhan Garikipati SVB, Bankole KS, **Gyamerah M**, Peeples TL (2008) Microbial oxidation of naphthalene to *cis*-1,2 naphthalene dihydrodiol using naphthalene dioxygenase in biphasic media. *Biotechnol Prog* 24: 593 - 598

**Gyamerah M**, Merichetti G, Adedayo O, Scharer JM, Moo-Young M (2002) Bioprocessing strategies for improving hen-egg white lysozyme (HEWL) production by recombinant *Aspergillus niger* HEWL WT-13-16. *Appl Microbiol Biotechnol* 60 (4): 403-407

**Gyamerah M** and Willetts AJ (1997) Kinetics of overexpressed transketolase from *Escherichia coli* JM 107/pQR 700. *Enzyme Microb Technol* 20: 127-134.

**Gyamerah M** and Glover J (1996) Production of ethanol by continuous fermentation and liquid-liquid extraction. *J Chem Tech Biotechnol* 66(2): 145-152.

Lilly MD, Chauhan R, French C, Gyamerah M, Hobbs GR, Humphrey A, Isupov M, Littlechild JA, Mitra RK, Morris KG, Rupprecht M, Turner NJ, Ward JM, Willetts AJ, Woodley JM (1996) Carbon-carbon bond synthesis: The impact of rDNA technology on the production and use of *Escherichia coli* transketolase. *Ann NY Acad Sci* 782: 513-525.

**Gyamerah M** (1995) Factors affecting the growth form of *Aspergillus terreus* NRRL 1960 in relation to itaconic acid fermentation. *Appl Microbiol Biotechnol* 44 (3-4): 356-361.

**Gyamerah M** (1995) Oxygen requirement and energy relations of itaconic acid fermentation by *Aspergillus terreus* NRRL 1960. *Appl Microbiol Biotechnol* 44 (1-2): 20-26

#### **Conference Proceedings and Presentations (5-7 most recent)**

Jaron Mackey, Bruna Menezes Mercy Ampaw-Asiedu, Jaycelyn Jefferson Abdoul Zampaligre, **Michael Gyamerah**, "Fermentation of simulated lignocellulosic hydrolysates using mixtures of authentic pentose and hexose sugars" Texas A & M University System 12<sup>th</sup> Annual Pathways Student Research Symposium, Corpus Christi, Texas, 10/23/2015

Kayla Robinson, Joshua Budu, **Michael Gyamerah**, Paul O. Biney, "A Rapid Method for Carbohydrate Analysis Using High-Performance Anion-Exchange Chromatography (HPAE) Coupled With Pulsed Amperometric Detection (PAD)", 41<sup>st</sup> Annual Meeting of the National Organization for the Professional Advancement of Black Chemists and Chemical (NOBCCChE), New Orleans, LA, September 23 – 26, 2014

Ashley Merritt, Paul O. Biney, **Michael Gyamerah** "Multistage Model for Biomass Pyrolysis Using Thermogravimetric Data", Texas A&M University System 11th Annual Pathways Student Research Symposium, Kingsville, Texas, 11/08/2013.

Bruna Menezes, **Michael Gyamerah**, Paul O. Biney, "A Kinetic Study of Biomass Decomposition Using Thermogravimetric Analysis", Texas A & M University System 11th Annual Pathways Student Research Symposium, Kingsville, Texas, 11/08/2013

Joshua Budu, **Michael Gyamerah**, Paul Biney, "Determination of biomass Extractives and Ionic Compositional Analysis of Water Soluble Biomass Extractives", Texas A & M University System 11th Annual Pathways Student Research Symposium, Kingsville, Texas, 11/08/2013

Eudel Dilworth, Damion Grant, **Michael Gyamerah**, "The Production of Biodiesel by Alkali-Catalyzed Transesterification of Non-Edible Weed Seed Oil", Texas A & M University System 11th Annual Pathways Student Research Symposium, Kingsville, Texas, 11/08/2013

Damion Grant, Eudel Dilworth, **Michael Gyamerah**, "The Production of Biodiesel from Non-Edible Weed Seed Oil by Enzyme-Catalyzed Transesterification", Texas A & M University System 11th Annual Pathways Student Research Symposium, Kingsville, Texas, 11/08/2013

## Teaching Related Activities

CHEG 1021 Introduction to Chemical Engineering Laboratory: Freshman laboratory course taught since fall 2010

CHEG 2013 Materials Science: Taught this sophomore level course in the fall 2010, and spring 2011 and 2012 semesters

CHEG 2043 Chemical Engineering Thermodynamics I: Sophomore level course taught in the fall 2007 and 2008 semesters

CHEG 2153 Introduction to Biochemical Engineering Fundamentals: Co-developed course for the Bioengineering Concentration in the department of Chemical Engineering was taught in the spring 2010 and fall 2011 semesters

CHEG 3013 Heat, Mass and Momentum Transport: Junior level course taught from fall 2001 to spring the fall 2009 semesters, and again in the fall 2012 semesters

CHEG 3051 Fundamentals of Engineering (FE): Reviewed, tested and graded FE chemistry for senior engineering students starting fall 2007 to fall 2009. Reviewed, tested and graded FE chemistry, biology and materials science for senior engineering students for spring 2010, fall 2010, spring 2011, fall 2011 and spring 2012 semesters

CHEG 3053 Chemical Engineering Thermodynamics II: Taught this junior level course in the spring 2008 and fall 2008 semesters

CHEG 3153 Introduction to Biotechnology: This elective course was developed for the Bioengineering Concentration in the Chemical Engineering Department and was taught in the Spring 2009, 2011 and 2012 semesters

CHEG 4153 Bioengineering: Taught this senior level elective course required for the Bioengineering Concentration in the spring 2008, 2010, 2011 and 2012 semesters

CHEG 4473/4472 & CHEG 4483/4482 Senior Design and Professionalism I and II: Taught these senior level capstone design courses since fall 2001 and spring 2002 semesters. 20 design projects were identified with each having the depth and breadth required to satisfy the ABET Professional Component, and involved the design of a chemical plant to ensure application of knowledge based on skills acquired in earlier courses.

GNEG 5193 Special Topics: Heat, Mass and Momentum Transport: Graduate level course taught in the fall 2007 semester.

Supervised Masters project titled "Process design and technological assessment of lipase-catalyzed production of biodiesel from vegetable oil and methanol" during the spring and fall 2010 semesters

### Graduate Students Supervised and Advised:

Kehinde Seun Bankole, "Solvent tolerance of a recombinant *Escherichia coli* strain for aryl oxidations", Masters Thesis, August 2006 (Chair, Student Advisory Committee)

Olurotimi Enitan Sonaike, "Measurement and prediction of the flash point of binary ideal and non-ideal solutions", Masters Thesis, December 2004 (Member, Student Advisory Committee)

Colin Akoto Kwabbi, "New results for flash point measurements and prediction for flammable

binary liquid mixtures”, Masters Thesis, December 2005 (Member, Student Advisory Committee)

Gbenga Ajiboye, “Economic and environmental impact assessment of alpha-naphthol production”, Masters Thesis, December 2007 (Member, Student Advisory Committee)

Babatunde Ekundayo, “Material property study of thermal battery components”, Masters Thesis, December 2008 (Member, Student Advisory Committee)

Elisha Taiwo Ahlinvide, “Studies on the role of macro-organisms in bioremediation of motor oil”, Masters Thesis, August 2012 (Member, Student Advisory Committee)

Dawn Harrison, “Impact of degree of crosslinking on the transport properties of immobilized metal affinity hydrogels”, Masters Thesis, December 2013 (Member, Student Advisory Committee)

Eudel Dilworth “Production of biodiesel by alkali-catalyzed transesterification of non-edible weed seed oil”, Masters Thesis, August 2014 (Chair, Student Advisory Committee)

Damion Grant, “Production of biodiesel by enzyme-catalyzed transesterification of a non-edible weed seed oil”, Masters Thesis, August 2014 (Chair, Student Advisory Committee)

Joshua Asiedu Budu, “Biomass Characterization and Kinetic Study, and Design of Fluidized Bed Reactor for Pyrolysis of biomass into Bio-oil”, Current Master student (Chair, Student Advisory Committee)

## **SERVICE RELATED ACTIVITIES**

Freshman advisor for the Department of chemical Engineering since fall 2010 and appointed by the Dean of the Roy G. Perry College of Engineering as a college of Engineering Freshmen University College Faculty Advisement Coordinator since fall 2011

Provided adequate hours and problem sections for all courses taught (see above).

Provided letters of recommendation to students to support their application for scholarships, graduate school and internships

Advisor of Student Chapter of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCCChE)

Member of the chemical engineering department Scholarship Committee

Member of the College of Engineering ABET Committee and the Chemical Engineering Department ABET Assessment Coordinator

SACS 2010 Assessment Coordinator for the Chemical Engineering Department

Served on four Tenure and Promotion Committees in the Roy G. Perry College of Engineering and on a search committee for an Assistant Professor in the Civil and Environmental Engineering Department

Appointed by the Dean of the Roy G. Perry College of Engineering as representative on the Texas Higher Education Board Tuning Oversight for Chemical Engineering

Chair of the Prairie View A & M University Institutional Bio-Safety Committee (IBC) - (2007 – 2015)

Member of the Human Subjects Internal Review Board (IRB) at Prairie View A & M University 2003 - 2015

Member of the PVAMU Academic Scholarship Committee

Roy G. Perry College of Engineering member on the University Senate 2010 - 2014

### **HONORS AND AWARDS**

2014 Outstanding Teacher of the Year Award for Roy G. Perry College of Engineering

2010 – 2011 and 2011 – 2012 Outstanding Professor Award for the Department of Chemical Engineering

Royal Norwegian Council for Scientific & Industrial Research (*NTNF*) Postdoctoral Fellowship, 1988-1990

British Commonwealth Academic Scholarship, 1980 -1983

### **PROFESSIONAL AFFILIATIONS**

Associate Member (AMICHE), Institution of Chemical Engineers (UK), 1999 – Present

Member, National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE), 2000 – Present

Member, American Society for Engineering Education (ASEE), 2002 - Present

Member, American Institute of Chemical Engineers (AIChE), 2005 - Present

### **PROFESSIONAL DEVELOPMENT**

Completed the Biological Safety Officer training program that meets the administrative and program for awarding Continuing Education Units (CEU) according the standards of the International Association for Continuing Education and Training by The University of Texas, School of Public Health, Southwest Center for Occupational and Environmental Health held at The Commons Center Building, J. Jake Pickle Campus, Austin, TX., September 2 – 3, 2008.

Attended the NSF sponsored BioMed workshop “Enhancement of Chemical Engineering Curricula with Biological Applications in Heat and Mass Transfer” held San Jose State University, from July 30 – August 1, 2009

(2007 – 2015)

Completed the Safety and Chemical Engineering Education (SACHE) Continuing Professional Competency courses ELA 901- SACHE Certificate Program: Safety in the Chemical Process Industries, and ELA 903- SACHE Certificate Program: Risk Assessment in May 2015.