Curriculum Vitae

TULIO CHAVEZ – GIL, Ph.D.
Associate Professor of Chemistry
Department of Natural Sciences
Coppin State University
Science & Technology Center - 235
2100 West North Ave
Baltimore, MD 21216-3698
tchagil@ymail.com; tchavez-gil@coppin.edu
Office: 410-951-4124; Cel: 410-564-6229

Statement of professional interests

For over 20 years, I have been involved in college/university level education as well as developing research with undergraduate/graduate students encompassing projects in:

1. Phytochemistry of Folk medicinal plants by using conventional extraction methods and recently by the introduction of a personal extractor innovation from which a US-Patent was in 2016.

2. Synthesis of azeotropic solvents for the extraction of algae-biodiesel as safe/clean biofuels by the cell wall disruption and attaining its raw energy content using the recently patented innovation.

3. Inorganic sol-gel matrices growing methods to synthesize frameworks of Ba-, Ca- Mg-, Sn-, Sb-tartaric acid/phosphate biomaterials for bio-based and bio-sensing determination properties.

4. Design and synthesis of new functionalized pyrazole ligands to obtain Cu, Ni, Mn, Mo, and W organometallic complexes for studies of olefin-metal bonding energies by using theoretical (DFT), electrochemistry, and spectroscopic methods.

5. Synthesis and characterization of metal-antibiotic vanadate/vanadyl complexes as bioinorganic artificial antibiotics against superbug strains especially those in the "*ESKAPE*" group.

6. Research in the synthesis and photophysical properties of functionalized metallo-porphyrins, as dye sensitizers for solar cell construction.

These projects has been designed to engage undergraduates/graduates in biomaterials, bioinorganic, organometallics, biochemistry, quantum mechanical (DFT) calculations, and hands-on raw material isolation/purification/characterization using liquid column chromatography (LC), GC-MS spectrometry, SEM-EDS, TEM, AFM microscopy, FTIR, UV-VIS, TGA, and NMR spectroscopy techniques available in the state-of-the art Science & Technology Center building at Coppin State University.

With this repertoire of analytical techniques, researcher students under my mentoring have improved both theory and hands-on experiences that prepare them with unique professional skills for a challenging and highly competitive work force. To perform those duties, I use and understand the operation and maintenance of the advanced laboratory equipment, commonly used in chemistry, physics, biochemistry, pharmaceutical, chemical/mechanical engineering, and material sciences, which have allowed me to teach to graduate/undergraduate learners the importance of developing hands-on skills to solve real problems in a broad scope of chemistry sub-disciplines. In addition, I am passionate about the geochemistry research of coals, petroleum, gemstones, rocks, and soils, especially its fluidic inclusions and petrologic characteristics.

Education

- **Ph.D**. (September 1997), Inorganic Chemistry, Thesis title: "*Supramolecular Properties of Polymetallic Ferro-Tetraiminic Complexes***"**, advisor: Dr. Henrique E. Toma. Instituto de Química, Universidade de São Paulo, São Paulo, SP, **Brazil**.
- **BS.** Chemistry**.** Universidad del Valle – Cali, **COLOMBIA** – 1991
- (**JSPS**) Post-doctoral, 1997-1999. School of Pharmaceutical Sciences, Kumamoto University, **Japan**
- **NIH**, Associate Researcher, 2000-2002. Department of Chemistry, University of Puerto Rico, Mayaguez, **PR-USA**

EMPLOYMENT HISTORY:

Position	Organization	Department	Period
Associate Professor	Coppin State University	Natural Sciences	04/2019 – present
Assistant Professor	Coppin State University	Natural Sciences	08/2014 - 04/2019
Associate Professor	Inter-American University of Puerto Rico, San German	Biology, Chemistry, Environmental. Sc	01/2009 – 08/2014
Assistant Professor	Inter-American University of Puerto Rico, San German	Biology, Chemistry, Environmental. Sc	01/2004 – 01/2009
Visiting Assistant Professor	Illinois State University, Normal, Illinois	Chemistry	June-August, 2005
Assistant Professor	University of Los Andes Bogota (Colombia, SA)	Chemistry	01/2003 - 12/2003
Associate Researcher (**NIH-MBRS**)	University of Puerto Rico Mayagüez Campus	Chemistry	07/2000 - 05/2002
Foreign Researcher Postdoctoral Fellow (**JSPS**)	University of Kumamoto, Kumamoto (Japan)	Faculty of Pharmaceutical Sciences	11/1997 – 12/1999
Teaching Assistant	São Paulo University (BR)	Chemistry	01/1995 – 07/1996
Researcher Assistant	Universidad del Valle (Colombia, SA)	School of Engineering	07/1990 – 07/1992

A. Performance as Teacher and Researcher

1. 08/2014 – Present. Coppin State University

A.1 - <u>Undergraduate Courses</u>

Fall: 2024, 2023, 2022, 2021, 2019, Fall 2018, Fall 2017, Fall 2016, Fall 2015, Fall 2014*
CHEM 405 - Advanced Inorganic Chemistry (lecture, labs)
CHEM 310 - Advanced Analytical Instrumentation (lecture, labs); **2022**
CHEM 103 – section 002 Chemistry for Health Sciences I (lecture, lab)
CHEM 103 – section 001 Chemistry for Health Sciences I (lecture, lab)
CHEM 103 – section 003 Chemistry for Health Sciences I (evening – lecture, lab)

Spring: 2024, 2023, 2022, 2021, 2020, 2019, 2018, 2017, 2016, 2015
CHEM -101 - General Chem I (lecture, lab) **2022**
CHEM- 102 - General Chem II (lecture, lab) **2023**
CHEM 103 – section 2838 Chemistry for Health Sciences I (lecture, lab)
CHEM 103 – section 1789 Chemistry for Health Sciences I (lecture, lab)

A.2 – <u>Graduate Courses</u>

CHEM 571 - *Thermodynamic of Polymers* (lecture, Lab**); Fall 2021-present**
CHEM 531 - *Fundamentals of Biomaterials*, (lecture, lab) **Fall 2022, Spring 2024**
CHEM 511 - *Electrochemistry of Polymers*, (Lecture) **Spring 2023**

B. **Master in Polymers and Materials Sciences Program at Coppin State University**, PMS (MHEC/USM prepared documents)

During 2018 Spring and Summer terms, I was responsible of drafting the description of the Master of Sciences in Polymers and Materials Sciences proposal that after revision with chemistry colleagues was submitted and approved by the Graduate Council Board at CSU as well as by the MHEC Board in 2020.

In the Fall of 2018, I developed the teaching materials for three MS courses to be taught in the master's program in Polymers and Materials Sciences (syllabi, rubrics, lectures, assignments, labs): 1. **Biomaterials** - CHEM-531; 2. **Thermodynamic of Polymers** - CHEM 571; and 3. **Electrochemistry of Polymers and Materials** - CHEM - 511 (Elective). These materials were submitted and approved by the Graduate Council Board at CSU and have offered been since the Fall 2021.

C. COMUNICATIONS: Proficiency in writing and verbal communications: Proficiency in reading, investigation, and public skills to communicate in: *English, Portuguese, Spanish, fair Japanese.*

D. Scientific Societies Membership:

- American Chemical Society (ACS), Divisions: *Biol Chem, Chem Edu, Inorg Chem*. **Active member**
- Algae Biomass Organization – 2018 - present

E. University Service

University Service (CSU) Senate/Development Committees

- 2023 – present. **General Education Requirements (GER) Committee** - member
- 2022 – present: **CASE Recognition and Celebration Committee** – member
- 2022: **Chaperone** of 2 students presenting research results in MARM'22, Trenton, NJ
- 2021-2022: **Provost-Vice-president Academic Affairs Search Committee** – member

CSU – Curriculum-New Programs Development:

2023- present: Chemistry for Heath Sciences (CHEM-103) Online course development
2018- 2020: Master Program in Polymers and Materials Sciences (Course materials development)
Courses Developed:
- **Biomaterials**; CHEM – 531, Advanced course (Lecture, Labs)
- **Polymers Thermodynamics**; CHEM – 571, Advanced course (Lecture, Labs)
- **Electrochemistry of Polymers and Materials**; CHEM - 511 (Elective)

Natural Sciences Departmental Faculty Search Committees

- Search committee member for Tenure-track faculty in Chemistry, Spring 2023.
- Search committee member for Tenure-track faculty in Biology/Physiology, Spring 2024.

E. Community Service

- 2018-present. Three universities are establishing *Academic Success via Postdoctoral Independence in Research and Education* or ASPIRE. Johns Hopkins, Morgan State, **Coppin State University** collaborate to promote STEM diversity. **Activity:** CSU post-docs mentor, and Undergraduates Seminar co-Coordinator.
- **2024**: **Exercise 3** for NIST Dietary Supplement Laboratory Quality Assurance Program **(DSQAP):**

April 15, 2024 - May 27th, **2024**. Kava, Vitamin A, and Vitamin B, *proximates*, *heavy metals analysis*: A National Inter-Lab participation. Biofuels & Biomaterials Lab at CSU (NIST # 074)

F. Professional Service

- 2022: **Session Creator & Coordinator**: *MARM'22*. ACS-Middle Atlantic Regional Meeting. Trenton, NJ.
- 2024: **Jude**, *ISCC-2024. Lincoln University, Lincoln Pennsylvania*. April 06, 2024
- 2015 – 2021: **Editorial Board Member**: *Structural Chemistry & Crystallography Communication Journal*, iMedPub. Com Journals (NIH) - USA.
- Reviewer of research manuscripts in several journals (see list of journals below)
- Reviewer of research-educational grants submitted at ACS-PRF.

G. Reviewer

- 2021 – present: **Geology Bulletin**, Industrial University of Santander (Colombia, SA).

- 2019 – present: **Science Group** – *American Journal of Biochemistry and Biotechnology*:
- 2020 -2021: Review of Detection Techniques for Chemical Oxygen Demand in wastewater.
- 2022: Preparation, characterization, and antioxidant activity of a novel acetylated polysaccharide from *Flammulina*

- 2019 – present: **Elsevier reviewer**
  - *Journal of Cleaner Production*:
  - Subcritical Water Technology for Enhanced Extraction of Biochemical Compounds from Chlorella vulgaris. 2019.
  - Performance and optimization studies of oil extraction from Nannochloropsis spp. And Scenedesmus obliquus. 2020.
  - *Saudi Arabia Chemical Society Journal*: 2019 -2020
  - Ref: JSCS-D-19-00736R2 Title: Molecular modeling and photovoltaic applications of porphyrin-based dyes: A review. Article Type: Review Article.
  - **Letters in Organic Chemistry (**May **2019**): MoO_3 nanoparticles as an efficient catalyst for the synthesis of pyrazoles in aqueous alcoholic medium at room temperature.

  - **Polyhedron** (August **2016**), Reviewer of manuscript: Ms. Ref. No.: POLY-D-15-00719 Title: Theoretical insights into M-SO bonds in transition metal-sulfur monoxide complexes [{N(SPMe2)2}2M(SO)] (M = Fe, Ru, Os): Assessment of density functionals and dispersion interactions.

  - **American Journal of Environmental Sciences**. (March **2016**). "Enhancement of Water Disinfection by the Use of Associated Uv, Sds and *Myovireadae* Phage".

  - **American Journal of Apply Sciences. (**Feb **2016**)**.** Manuscript # 4267-AJAS, entitled "*Design of miniaturised 2bits phase shifter using Koch-Fractal-shaped microstripline*".

  - **Structural Chemistry & Crystallography Communication Journal.** (Sept **2015**). Ref.: Ms. No. iMedPub Journals-15-990. Title: Bis(1-(2,6-xylyl)-2-imidazolidinethione Gold(I) and Copper(I) Halides: Synthesis, characterization, and structure.

H. Collaborations

- **Coppin State University**. Dr. Emmanuel Atta-Obeng. *Sycamore Biomass transformation*.
- **Coppin State University**. *Dr. Jude Namanga. Sycamore Biomass transformation.*

- **Central-Western University (Brazil)**. Department of Chemistry: Dr. Fauze J. Anaissi: Metal-Abietates.
- **UMD***:* Dr. Peter L. May; *Algal Ecotechnology Center Dept. of Environmental Science and Technology*. Dr. Larry Davies. *Macro*-algae for Biofuel and Biomass extraction-transformation.
- **IMET:** *University of Maryland Center for Environmental Science*. Dr. Feng Chen. *Scenedesmus Obliquus* Pigments extraction and Characterization.
- **Georgia College and State University,** Dept. of Chemistry, Physics and Astronomy. Dr. Peter J. Rosado-Flores: Bio-inorganic and Organic Framework Materials.
- **Illinois State University**, Department of Chemistry, Normal. Illinois: Dr. Christopher G. Hamaker. *X-rays crystal determinations.*

I. Undergraduate/Graduate Research Mentorship (2024 – 2025)

Coppin State University:

1. Current group:	**Research Subject**
- Ms. Carolina I. Pellicier (MS candidate 2025)	Modified Blended Cement and Resins
- Mr. Pedro J. Marte-Ortiz (MS candidate 2025)	Ca-Hydroxyapatite-blended biomaterials
- Ms. Taylor Fullwood (Biology candidate 2025)	Cyano Bacteria biomass pyrolysis
- Ms. Braxton Kess (Biology candidate 2025)	Mix algae biomass transformation
- Mr. Cameron Blunt (Chemistry candidate 2028)	Spent Coffee Ground biomass pyrolysis transformation
2. Former students: (2021-2024)	
- Ms. Imani, Blackman-Murray (Biology candidate 2026)	Spirogyra biodiesel fuel
- Mr. Donald E. Knight (Biology candidate 2026)	Kelp phenols, proximate extraction
- Ms. My'Sean Suggs (Biology candidate 2025)	Ashwagandha whitanolides, whitanosides
- Mr. Angelo Chatmon (Biology candidate 2025)	*Scenedesmus Obliquus*. sp pigment studies
- Ms. Viviana Wamari (Biology candidate 2026)	*Cyano bacteria.* Protein extraction/characterization
- Ms. Tanae. Moore-Buchannon (Biology candidate 2025)	NIST project (2022)
- Ms. Kirah. Knox (Biology candidate 2025)	NIST project (2022)
- Mr. Luis R. Perez Jr. (Biology candidate 2025)	NIST project (2022)
- Mr. D'Angelo Thompson (Biology class 2024)	Biomaterial's - hydroxyapatite
- Ms**.** Chante Lee (Biology class 2021)	Algae biodiesel
- Ms. Chinoye. Ndubueze (Biology class 2021)	Algae Blended polymers
- Ms. Amanda Robinson (Chemistry candidate 2023)	Ca^{++}, Mg^{++} Biomaterials
- Ms. Satia. Dennis (Biology class 2021)	Phosphate Biomaterials

J. Publications

Patents:

1. **T. Chavez-Gil**, United States Patent: USPTO-No. 9, 259, 666-B1. "Compact Extractor/Separator Apparatus for Solid/Liquid/Gel Sample. Feb **2016**.

Textbook:

1. Tulio. Chavez-Gil., **2023**: "*Semi Critical Assisted Extraction: Applications and Commercialization in Biotechnology, Food, and Pharmacy*". 1st Edition. Jenny Stanford Pub/Taylor and Francis, Singapore/London.

DOI: https://doi.org/10.1201/9781003291244
ISBN: 978-981-49-6836-2 (Hardcover) 350 pp.
ISBN: 978-1-003-29124-4 (e-Book) 298

K. Peer-reviewed publications (undergraduates are underlined)

- "***Synthesis of new metal-saccharin complexes as antimicrobial inorganic pigment for surfaces"*** Author(s): Acorone Soares, Camila; Appelt, Patricia; da Silva, Weslei; Alves da Cunha, Mário; Chavez-Gil, Tulio; Toma, Henrique; Anaissi, Fauze. Manuscript ID: ic-2025-00588k Journal: Manuscript Status: ACS-Inorganic Chemistry. **Under revision**

- **"**Insights into the spectroscopy, conductivity, and thermal stability of Alkali and Alkaline Earth Metal Tartrates". **T. Chavez-Gil**; Peter J. Rosado-Flores; Pedro Marte-Ortiz; Satia Dennis; George Watmore, *ACS-Omega*. **2024**, under revision.

- "Colombian Euclases Geochemical Dyes Genesis: Micro-elemental analysis assessed by FESEM-EDS, FTIR, micro-Raman, X-rays methods". F H. Romero-Ordoñez, T. Chavez-Gil. **2024**. In preparation.

L. Oral Presentations

- *"Inorganic green-synthesis, spectroscopic, electrochemistry, and colorimetric assays of metal-abietate complexes: New robust multifunctional inorganic/materials*" Aline B. Schons, Patrícia Appelt, Jamille S. Correa, Fauze J. Anaissi, **Tulio Chavez-Gil** (Presenter). **ACS Spring 2024.** National Meeting. New Orleans. March 17-21, **2024.** Coordination Chemistry Section, March 20.

M. Congresses presentations (undergraduates are bold and underlined)

- *"Seaweed cyanobacteria macro-algal biodiesel extraction: Exploring semi critical assisted extraction-SmCAE technology"*. **Imani A. Blackman-Murray** **(UG),** Tulio Chavez-Gil(PI). **ISCC-2024**. Lincoln University. Lincoln, PA. April 06, 2024.

- "Antioxidants and proteins of Ashwagandha extracted by *semi critical CO_2-ethanol thermal assisted method".* **My 'Sean Suggs** (UG), Tulio Chavez-Gil (PI). **ISCC-2024**. Lincoln University. Lincoln, PA. April 06, 2024.

- "Improvements in Kelp metabolites extraction: A Case Study using CO_2-Ethanol frozen phase in a Semi Critical Assisted Extraction technology". **Donald C Knight. Jr** **(UG),** Tulio Chavez-Gil(PI). **ISCC-2024**. Lincoln University. Lincoln, PA. April 06, 2024.

Tulio Chavez-Gil

Tulio Chavez-Gil, PhD
March 19, 2025