Aditya S. Ponukumati

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SUMMARY (SEPTEMBER 2023)

Chemical engineer specializing in chemical kinetics, reaction engineering, and applications of statistical and machine learning tools to physical data set analysis. Professional experience in heterogeneous catalytic conversion of lignocellulosic biomass for production of value-added commodities. Searching for a career as a consultant, or broadly any field that transitions academic research towards industrial contexts. Based in St. Louis, MO, but willing to relocate.

EDUCATION

Ph.D. in Chemical Engineering, Washington University – St. Louis, MO, USA — Expected 2024
Department of Energy, Environmental & Chemical Engineering
Thesis: Investigating Catalytic Lignin Depolymerization Processes at Low Temperatures

B.S. in Chemical Engineering, Virginia Tech – Blacksburg, VA, USA — 2015 - 2019
Department of Chemical Engineering
Graduated Magna Cum Laude & Honors Scholar

SELECTED PUBLICATIONS

Ponukumati, A.; Carr, R.; Gao, Y.; Shang, Z.; Krishnamurthy, A.; Moon, T.-S.; Foston, M.; Integrating lignin-first biorefining and biological funneling using wild-type Rhodococcus opacus PD630. *Manuscript in progress.*

Ponukumati, A.; Gao, Y.; Li, H.; Walker, M.; Zou, X.; Jeon, S.; Barrett, J.; Hosseinaei, O.; Harper, D.; Ford, P.; Williams, B.; Foston, M.; Chemical Profiling Catalytic Lignin Depolymerization Using Positive Matrix Factorization Deconvolution of Mass Spectral Data. *Submitted: RSC Green Chemistry.* (2023).

Zhang, J.; Yang, Z.; **Ponukumati, A.**; Senanayake, M.; Pingali, S. V.; Foston, M.; Structural Evolution of Lignin Using in-situ Small Angle Neutron Scattering During Catalytic Disassembly. *Submitted: RSC Green Chemistry.* (2023).

Page, C.; Peralta, A.; **Ponukumati, A.**; Moher, D.; Foston, M.; Thimsen, E.; Plasma-catalytic synthesis of acrylonitrile from methane and nitrogen. *Submitted: AIChE Journal.* (2023). https://doi.org/10.22541/au.168883924.41597796/v1.

Laarhoven, T.; **Ponukumati, A.**; Towards Transparent Cheat Detection in Online Chess: An Application of Human and Computer Decision-Making Preferences. *Computers & Games.* (2023). https://doi.org/10.1007/978-3-031-34017-8_14.

Roell, G.; Schenk, C.; Anthony, W.; Carr, R.; **Ponukumati, A.**; Kim, J.; Akhmatskaya, E.; Foston, M.; Dantas, G.; Moon, T.-S.; Tang, Y.; García Martín, H.; A High-Quality Genome-Scale Model for Rhodococcus opacus Metabolism. *ACS Synthetic Biology.* (2023). https://doi.org/10.1021/acssynbio.2c00618.

Paradzinsky, M.; **Ponukumati, A.**; Tanko, J.; Mechanism and Kinetics of the Reaction of Nitrate Radical with Carboxylic Acids. *ChemPlusChem.* (2022). https://doi.org/10.1002/cplu.202200213.

SELECTED TALKS AND POSTERS

Talk: **Ponukumati, A.**; Carr, R.; Gao, Y.; Shang, Z.; Moon, T.-S.; Foston, M.; Hybrid Conversion of Lignin into Biodiesel. Annual AIChE Meeting – Orlando, FL, USA. (Expected 2023).

Talk: **Ponukumati, A.**; Gao, Y.; Li, H.; Walker, M.; Zou, X.; Jeon, S.; Barrett, J.; Hosseinaei, O.; Harper, D.; Ford, P.; Williams, B.; Foston, M.; 14-factor model for catalytic depolymerization product distributions between lignin species. ACS Midwest/Great Lakes Regional Meeting – St. Charles, MO, USA. (Expected 2023).

Talk & Poster: **Ponukumati, A.**; Carr, R.; Gao, Y.; Shang, Z.; Krishnamurthy, A.; Moon, T.-S.; Foston, M.; Integrating lignin-first biorefining and biological funneling using wild-type Rhodococcus opacus PD630. ACS Spring 2023 – Indianapolis, IN, USA. (2023).

Talk: Laarhoven, T.; **Ponukumati, A.**; Human and Computer Decision-Making in Chess with Applications to Online Cheat Detection. International Conference on Computers & Games – Virtual, Earth. (2022).

Poster: Chen, X.; **Ponukumati, A.**; Foston, M.; Thimsen, E.; Plasma-Liquid Interface for Promoting Organic Electrosynthesis without Solid Electrodes. AIChE Annual Meeting – Phoenix, AZ, USA. (2022).

Poster: Anthony, W.; Diao, J.; Roell, G.; **Ponukumati, A.**; Hu, Y.; Carr, R.; DeLorenzo, D.; Davis, K.; Wang, B.; Ning, J.; Foston, M.; Zhang, F.; García Martín, H.; Tang, Y.; Moon, T.-S.; Dantas, G.; Elucidating Aromatic Utilization Mechanisms in Engineered Rhodococcus opacus Strains for Lignin Valorization. DOE Genomic Sciences Program Annual PI Meeting – Virtual, Earth. (2021).

PROFESSIONAL EXPERIENCE

Graduate Research Assistant Jul 2019 - Present
Washington University – Supervised by Prof. Marcus Foston *St. Louis, MO, USA*

- Leveraged multivariate statistical and machine learning tools to process data sets and perform simulations.
- Engineered the interface between thermochemical lignin-first biorefining and microbial product funneling.
- Synthesized bimetallic heterogeneous catalysts and found kinetic parameters using model substrate experiments.

Server Administrator Mar 2020 - Sep 2021
Lichess.org *Virtual, Earth*

- Issued fair play violation sanctions to delinquent users after collecting statistically and legally robust evidence.
- Oversaw research and development efforts, recruit training, and documentation of standard operating protocols.
- Contributed to site-wide policy decisions pertaining to fair play administration and user experience.

Undergraduate Research Assistant Aug 2017 - May 2019
Virginia Tech – Supervised by Prof. James Tanko *Blacksburg, VA, USA*

- Calculated rate constants for hydrogen-atom abstraction reactions of various radical species and carboxylic acids.
- Characterized the transition state of chemical intermediates on the reaction coordinate of these systems.
- Verified a previously unprecedented reaction mechanism for decarboxylation reactions involving nitrate radicals.

Laboratory Technician Summers 2017 & 2018
SICPA Securink Corp. – Supervised by Dr. Srinivas Uppuluri *Springfield, VA, USA*

- Identified quality control parameters and developed test methods for screening currency-black inks.
- Determined the magnetic hysterisis and elemental concentrations of various currency ink precursors.
- Developed an acid value titration test for quality control and assigned Raman spectra peaks of ink varnishes.

Naval Research Enterprise Intern Summers 2014 - 2016
U.S. Naval Observatory – Supervised by Dr. Victor Slabinski *Washington D.C., USA*

- Modeled residuals in solar radiation force models of GPS satellite orbits that are attributed to outgassing effects.
- Wrote software that pulls recently published satellite position data and incorporates them into the model.
- Estimated typical outgassed water vapor masses on various satellites given regressed model parameters.

TEACHING EXPERIENCE

- Chemical Kinetics and Catalysis – Assistant to Prof. Grigoriy Yablonsky. (2021).
- Unit Operations Laboratory – Assistant to Prof. Trent Silbaugh. (2020).

SKILLS

- *Areas of Expertise:* Heterogeneous catalysis, chemical kinetics, reaction engineering, population balance modeling, factor analysis, explainable artificial intelligence / machine learning.
- *Instrumentation:* Gas chromatography (GC), mass spectrometry (MS), gel permeation / size exclusion chromatography (GPC/SEC), nuclear magnetic resonance spectroscopy (^{1}H, ^{13}C, ^{19}F NMR), laser flash photolysis.

- *Software:* Python, Matlab, Fortran, Aspen, Igor.
- *Languages:* English, Telugu, Spanish.

MISCELLANEOUS

- *Investing:* Seeking Alpha stock/ETF analyst with over 200 followers (2022 - Present).
- *Chess:* Earned the US Chess Candidate Master title (2023).
- *Tetris:* Maybe some day I will have a Tetris accolade to put on a CV...