Julius Choi

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Summary

- Results-driven process development engineer with a focus on R&D, possessing skills and experience in process development, design and hands-on operation of new processes identifying process parameter and optimization of process condition and the scale-up from lab to pilot to demonstration scale. Expertise in developing process models, conducting simulations and performing statistical data analysis for experimental results and techno-economic analyses for novel conceptual processes. Experienced and skilled in equipment sizing, technical documents preparation and technology transfer to Contract Manufacturing Organizations (CMO). Collaborates with different teams to successful process development. Additionally, possess skills to design and conduct experiments, design and fabricate new experimental prototypes, and conduct data analysis. Proven track record of resolving empirical issues and ensuring project completion on schedule.

Work Experience

DSP Scientist Aug 2023 – Jan 2024

21stBio, inc , Davis, California

- Established pilot facilities for downstream process development to address customer issues
- Led the contract with external labs to source the required equipment for testing

Senior Process Engineer April 2022 – Aug 2023

BCD Bioscience, Sacramento, California

- Created the conceptual process design and conducted techno-economic analysis to identify the important process parameters for economical process operation leading to optimization of reaction condition by chemistry team and development of economical downstream process by engineering team
- Managed $200K project budgets to purchase reactors, centrifuges, filter dryers, filtration system and spray dryer to set up and operate pilot facilities that resulted in successful scale-up from 2 L to 300L for in-house sample production and technology transfer to CMOs through technical document preparation.
- Established and led an engineering team providing training to engineers and operators resulting in successful downstream process development and process condition optimization.
- Established relationship with vendors and external labs like ABPDU resulting in the successful pilot testing of developed technology
- Actively participated in the development of food safety plans and GRAS dossier

Postdoctoral Fellow Feb 2021 – April 2022

Joint BioEnergy Institute, Emeryville, California and Sandia National Laboratories, Livermore, California

- Utilized design of experiment (DOE) with data analysis tool like JMP for successful development of biomass pretreatment process and optimization of the process conditions

Research Process Engineer Aug 2018 – Dec 2020

Earth Energy Renewables, Bryan, Texas

- Played a key role in the collaborative plant design working with an engineering firm that resulted in a demonstration plant for 256lbs/day volatile fatty acid production through scale up from pilot plant

- Created PFD, P&ID and hydraulics for a demo-scale fermentation process
- Utilized ASPEN plus to develop a model and simulation of downstream process including liquid-liquid extraction, vacuum distillation, gas stripper and batch distillation leading to successful equipment sizing and performance prediction to meet process requirement and product specification
- Developed and operated a pilot-scale extraction and distillation process that resulted in successful separation of high-value chemicals from a fermentation broth meeting the product specification
- Designed and conducted experiments in both lab and pilot plant
- Developed the method to analyze the metal contents in the broth and the products using ICP-MS contributing 100 times OPEX cost reduction
- Designed a conceptual process for FDCA production and performed techno-economic and life-cycle analysis

Graduate Researcher Sep 2012 – Aug 2018

BETA Lab – Texas A&M University, College Station, Texas

- Independently planned and managed a project for the development of wastewater treatment process using python and regression skills and applying the design of experiment (DoE) using JMP and conducting techno-economic analysis that resulted in a new research grant funded by Shell
- Designed and constructed the system for testing biomass waste pyrolysis condition by setting up several reactors and distillation possessing process monitoring and controlling system
- Collaborated in designing and set-up of a pilot-scale activated carbon production process from biochar using steam gasification which achieved 5 kg/h production rate needed for investigation of the possibility of new products for soil amendments and wastewater treatment application.
- Independently managed a project aimed to fabricate microporous gas separation membranes by coating graphene oxide and crystallization of MOF
- Collaborated with professionals by applying knowledge of unit operation and process chemistry as evidenced by the development of photocatalytic reactor and measurement system
- Acquired strong team player skill while working on a team-oriented project that tested the degradation behavior of Fire-retardant materials and analyzed Executive Order 13650: Improving chemical facility safety and security.
- Trained visiting students and professionals from diverse backgrounds for several research projects, which they needed to complete, resulting in well-maintained lab equipment and the completion of their theses.

Graduate Summer Internship Jun 2016 – Aug 2016

Southwest Research Institute (SwRI), San Antonio, Texas

- Proactively acquired new knowledge to design and develop a pyrolysis apparatus for catalytic hydropyrolysis under high-pressure condition.

Graduate Researcher Sep 2009 – May 2012

Biochemical Engineering Lab – Sogang University, Seoul, Korea

- Collaborated with researchers to write a research proposal that garnered a $2.5 million grant funded by the Korean government over five years.
- Worked on fermentation study to produce 2,3-butanediol by strain screening, process parameter screening and optimization of fermentation condition using design of experiment and kinetic study.

Senior Staff Sergeant Oct 2003 – Jan 2007

Chemical Corps – Republic of Korea Air Force, Gimhae, Korea

- Strong leadership as a platoon commander for CBR defense: The decontamination of the chemically contaminated base and the transport airplane, leading to Chief of Staff award in CBR defense competition

Education

Ph. D. in Biological and Agricultural Engineering, Texas A&M University, College Station, Texas Dec 2017

MS in Chemical and Biomolecular Engineering, Sogang University, Seoul, Korea Aug 2011

BS in Chemical and Biomolecular Engineering, Sogang University, Seoul, Korea Aug 2009

Certifications

IBM Data Analyst Professional Certificate Dec 2017

Techniques, Software & Instrumentation

AspenPlus	Proximate analysis	BET	Statistical analysis
Matlab	Elemental analysis	HPLC	Design of experiment
Python	Bomb calorimeter	GC/MS, FID, TCD	Korean
JMP	Biomass composition analysis	XRD	English
PCR	Raman Spectroscopy	SEM	Chemical engineering
SuperPro	UV Spectroscopy	TGA	Bioprocess engineering
ExtendSim	Viscosity meter	FT-IR	GPC

Affiliations, Awards & Scholarships

- Best Poster Award, Texas A&M Conference on Energy
- MRS Best Poster Award nominee, Material Research Society
- BAEN GSA Travel Award and BAEN Graduate Student Competitive Scholarship
- Chief of Staff Award in CBR defense competition
- Chief of the Korean Students Association in Department of Chemical Engineering at Texas A&M University
- Chief of the Newspaper Editorial Department in Sogang University

Publications & Patents

- Julius Choi, A Rodriguez, BA Simmons, JM Gladden, Valorization of Hemp-Based Packaging Waste with One-Pot Ionic liquid technology, Molecules, 2023, 28 (3), 1427
- Hyunwoo Kim*, J Choi*, J Park, Wangyun Won, Production of sustainable and renewable biomass-derived monomer: Conceptual process design and techno-economic analysis, Green Chemistry, 2020, 22 (20), 7070-7079 (*equal contribution)

- Hyunwoo Kim*, J Choi* and Wangyun Won, Process synthesis and analysis of green plastic monomer production from cellulose, Journal of Cleaner Production, 2020, 277, 124072 (*equal contribution)
- J Choi*, H Nam and SC Capareda, Effect of metal salts impregnation and microwave-assisted solvent pretreatment on selectivity of levoglucosenone and levoglucosan from vacuum pyrolysis of ashe juniper waste, Journal of Environmental Chemical Engineering, 2019, 7 (1), 102796 (*first and corresponding author)
- J Choi, W Won and SC Capareda, The economical production of functionalized Ashe juniper derived-biochar with high hazardous dye removal efficiency, Industrial Crops and Products, 2019, 137, 672-680
- J Choi*, H Nam, S Carter and SC Capareda, tuning the physicochemical properties of biochar derived from Ashe juniper by vacuum pressure and temperature, Journal of Environmental Chemical Engineering, 2017, 5 (4), 3649-3655 (*first and corresponding author)
- J Choi, HT Kwon, and HK Jeong, Fabrication of Thin Metal-Organic Framework MOF films on Metal-ion crosslinked GO-modified supports, MRS Advances, 2017, 1-8.
- H Nam, J Choi and SC Capareda, Comparative study of vacuum and fractional distillation using pyrolytic microalgae (Nannochloropsis oculata) bio-oil, Algal Research, 2016, 17, pg 87-96
- Y Dong, J Choi, HK Jeong and DH Son, Hot Electrons Generated from Doped Quantum Dots via Upconversion of Excitons to Hot Charge Carriers for Enhanced Photocatalysis, *J. Am. Chem. Soc.*, 2015, 137 (16), 5549–5554
- JW Lee, SJ Lee, BR Kim, WJ Choi, Method for preparing meso-2,3-butanediol, WO 2012124890 A2 (2012)