CBET Industry Training Series

Title: Microbial Fermentation & Recombinant Protein Production Training

Date: August 24 - 27, 2021

Location: Stack Family Center for Biopharmaceutical Education and Training
NanoFab East, 257 Fuller Road, Albany NY 12203

Why Attend This Course: This training program will emphasize lectures and laboratory work on advances in fermenter design, fermentation regimes, and process analytical technology tools. Process intensification techniques and strategies, design of experiment, strain screening, media and growth optimization, recombinant vaccine production will also be covered. Emphasis will also be placed on the interface between upstream and downstream processing and optimization of an entire process through troubleshooting.

What Will You Learn:

- Microbial growth and bioprocessing
- Scale-up strategies
- Engineering design aspects of fermentation vessels (including kinetics, mixing, aeration, and mass transfer)
- Advances in fermenter design and fermentation regimes
- Process analytical technology tools
- Process intensification techniques and strategies
- Design of experiment
- Strain screening
- Media and growth optimization
- Aspects of recombinant vaccine production

Who Should Attend:

- Scientists and engineers who are new to production utilizing microbial fermentation
- Biomanufacturing supervisors and managers who need to better understand the microbial fermentation process
- Personnel such as QA/QC and validation professionals who support microbial production but may not be knowledgeable about execution of the processes they support
- Vendors who supply the industry with equipment and components

For more information, contact: Diana Bartlett, Corporate Engagement Leader at 518-694-7746 or at Diana.Bartlett@acphs.edu

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Schedule

Day 1 **Tues, Aug 24**	*AM Lecture*	• Biofermentation and Recombinant Protein Production in Microbial Systems • Strain Development & Improvement • Media and Growth Optimization-DOE & Response Surface Methodology (RSM) Techniques
	PM Lab	• Fermenter Preparation, Setup, Media Addition, Calibration, & Sterilization
Day 2 **Wed, Aug 25**	*AM Lecture*	• Microbial Kinetics; Titer, Yield, Productivity, Purity & Efficacy • Metabolic Pathways & Engineering • Computer Control of Fermentation
	PM Lab	• DO Calibration, Fermenter Seeding, Process Parameters, Sample Collection and Sample Assays
Day 3 **Thurs, Aug 26**	*AM Lecture*	• Process Optimization: Transport Phenomena in Fermentation • Industrial Scale Fermentation • Scale-up Strategies; Bench to pilot to production scale
	PM Lab	• Time-Course Sampling, Sample Assay, Contamination Check, Harvest, Final Data Analysis
Day 4 **Fri, Aug 27**	*AM Lecture*	• Microbial Platforms for Vaccine Production • Process Intensification • QbD/PAT
	PM Lab	• Aeration and Oxygen Mass Transfer Experiment; Steady-State vs Unsteady-State • Data Analysis

Instructors
Ehsan Mahdinia, PhD, ACPHS-CBET
Meenakshi Malik D.V.M., PhD, ACPHS-BCS
Kamal Rashid PhD, ACPHS-CBET
Julian Rosenberg PhD, ACPHS-CBET
Oumou Diallo MS, ACPHS-CBET
Eric Yager, PhD, ACPHS
Payel Datta, PhD, ACPHS-CBET

Cost
Per Person $3,400

Register
cbet.acphs.edu/industry-training/register-for-industry-training/

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Instructor Bios

Ehsan Mahdinia, Ph.D., ACPHS-CBET

Dr. Mahdinia joined Team CBET in July 2020 as a founding faculty to help establish lab capacity in designing, procurement, installation and commissioning lab space and instruments. As a result, he holds excellent prowess in training professionals and students coming to CBET with hands-on and in-depth trainings. Dr. Mahdinia is an expert in fermentation technologies and an accomplished teacher. Since joining CBET at ACPHS from Penn State University, he has taught microbial fermentation, downstream processing of biopharmaceuticals and pharmaceutical microbiology courses from the PSM syllabus, with excellent feedback from students and trainees. Dr. Mahdinia earned a BS in Chemical Engineering and an MS in Biotechnology at Sharif University of Technology, Tehran, Iran. He earned his doctorate in Agricultural and Biological Engineering with a focus on bioprocessing engineering at Penn State University. His dissertation work explored vitamin K production from bacteria using biofilm reactors. Dr. Mahdinia is an author of 13 peer-reviewed publications and three book chapters in the fields of fermentation technologies and food safety engineering.

Meenakshi Malik D.V.M., Ph.D., ACPHS-BCS

Dr. Meenakshi Malik received her PhD in Immunology from Indian Veterinary Research Institute in 1998 and completed a Post-Doctoral Fellowship at Albany Medical College in the field of Microbial Pathogenesis in 2008. She joined the Albany College of Pharmacy and Health Sciences as an Assistant Professor in 2010 and was recently promoted to full Professor in 2020. She currently teaches Microbiology and Bacterial Pathogenesis courses at both the undergraduate and graduate level and serves as the Director of BS Microbiology and MS in Molecular Biosciences program at ACPHS. Dr. Malik has been the recipient of more than 2.3 million dollars in funding from NIH for her research program and has published 47 papers and given more than 90 presentations in national and international conferences in the field of host-pathogen interactions. She is a member of multiple study sections at the NIH and American Heart Association.

Dr. Malik's long term research goals are to understand the complexities of host pathogen interactions for the development of improved prophylactics against important bacterial infections. Her lab has a long standing research project to investigate the mechanisms by which *Francisella tularensis*, a category A biothreat agent survives inside the immune cells and suppresses the protective immune responses. A recent area of focus in her lab is investigating the molecular mechanisms leading to the development of antibiotic resistance in *Staphylococcus aureus* using a bioreactor infection model.

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Kamal Rashid Ph.D., ACPHS-CBET

Dr. Kamal A. Rashid has over 40 years of academic experience in research, teaching and workforce development programs for the bio-based industries. During his career he has developed, directed, and implemented biotechnology/biomanufacturing training programs at Worcester Polytechnic Institute, Utah State University, Penn State University and internationally. Presently, he is the founding director of the Stack Family Center for Biopharmaceutical Education and Training (CBET) at Albany College of Pharmacy and Health Sciences. Dr. Rashid received his undergraduate degree from University of Baghdad, Iraq with distinction and PhD from the Pennsylvania State University with superior ranking. His major areas of research and educational interests are in bioprocessing and genetic toxicology. He is an expert in animal cell culture technology with over 25 years of teaching graduate level courses at the institutions that he served as a faculty member. He has received numerous awards including the international professor of the year award at Utah State University and faculty service award at Penn State University.

Julian Rosenberg Ph.D., ACPHS-CBET

Julian Rosenberg is the Associate Director of the Stack Family Center for Biopharmaceutical Education and Training at Albany College of Pharmacy and Health Sciences. He has more than 10 years of diverse experience in start-up and industry settings, where he focused on alleviating bottlenecks at the interface of upstream and downstream processing. Dr. Rosenberg earned his PhD in Chemical and Biomolecular Engineering from Johns Hopkins University, where he developed novel molecular genetic tools and scale-up strategies to leverage microalgae for sustainable bioprocessing. Dr. Rosenberg has authored more than 25 peer-reviewed publications, including three book chapters, and is listed as an inventor on four issued patents. His research interests span the continuum of industrial biotechnology with emphasis on recombinant protein biologics, biofuels, and large-scale sterilization.

Oumou Diallo MS, ACPHS-CBET

Oumou Diallo, MS, Bioprocess Operations Manager, CBET. Ms. Diallo has robust industry experience in cell culture from her career at Cytiva (formerly GE Healthcare). She has specific expertise in mammalian cell culture, monoclonal antibody production, protein purification, as well as quality control. She is trained in cGMP operations, including analytical method development, cell culture media optimization and growth investigations, and authorship of SOPs. Ms. Diallo earned her Master of Science in Biological Engineering from Utah State University.

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Eric Yager, PhD, ACPHS

Dr. Eric Yager is an Associate Professor of Microbiology in the Department of Basic and Clinical Sciences at the Albany College of Pharmacy and Health Sciences. Additionally, as a faculty member of the College's Center for Biopharmaceutical Education and Training Dr. Yager is involved with student instruction, the development of workshops for workforce training, and helping to identify opportunities for partnerships and collaborations in industry and academia. Dr. Yager brings more than 15 years of experience in the areas of virology, immunology, antibody-based therapies, anti-virals, and vaccines. His current research focuses on human diseases caused by enveloped RNA viruses including COVID-19, influenza, AIDS, and congenital Zika syndrome.

Dr. Yager earned his Doctoral degree in Biomedical Sciences from the University at Albany. He has authored more than 25 peer-reviewed publications, has given invited talks at several regional and national scientific conferences, and has been interviewed by several media outlets including CNN and NBC News. Dr. Yager is also enthusiastic about educating individuals on viruses and vaccines, as demonstrated by his continuing guest spot on talk radio to discuss the COVID-19 pandemic and his public webinars on vaccine confidence.

Payel Datta, PhD, ACPHS-CBET

Dr. Payel Datta is the Senior Scientist at the Stack Family Center for Biopharmaceutical Education and Training (CBET). Dr. Datta has a rich experience in course curriculum design and teaching to a wide range of audience (both biology majors and non-majors). Dr. Datta has over 10 years of research experience, that are academic-industrial collaborative projects. These projects broadly focus on, (1) biomanufacturing of value-added chemicals using either mammalian or microbial platforms, and (2) developing bioanalytical tools to study drug characterization and safety. The projects have led to numerous technical documents, one patents, and over 25 publications, including book chapters, review articles, peer-reviewed publications, and abstracts and presentations.