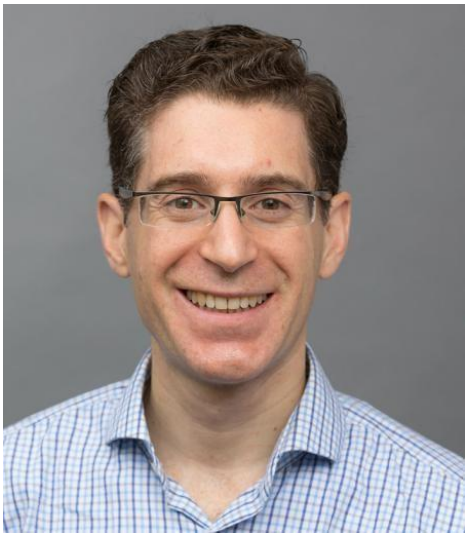
Fall 2024 Retreat
Graduate Training Program in Quantitative and Chemical Biology

August 24, 2024
Switchyard Park Pavilion
1601 S Rogers St, Bloomington, IN 47403

9:10 - 9:40 am	**Breakfast and Opening Remarks**	Dr. Giedroc/ Dr. Lewis
9:40 – 10:00 am	Student Speaker	Andrew Bach (Snaddon)
10:00 – 10:20 am	Student Speaker	Lauren Augusta (Fuqua)
10:20 – 10:40 am	Student Speaker	Abigail Garrett (Winkler)
10:40 – 11:30 am	Keynote Speaker	Dr. Jeremy Baskin (Cornell University)
11:30 – 12:30 pm	**Lunch**	All
12:30 – 1:50 pm	*Poster Session/Social Time*	Presenters A-J (first name)
1:50 – 2:10 pm	Business Meeting	For training cohort
2:10– 2:30 pm	Student Speaker	Emily Erdmann (Hundley)
2:30 – 2:50 pm	Student Speaker	Elizabeth Ruscitti (Jacobson)
2:50 – 3:10 pm	Student Speaker	Victoria Lopez (Tracey)
3:10 – 3:30 pm	Student Speaker	Cayla Rose (Dann)
3:30 – 3:50 pm	Student Speaker	Emma McRae (Giedroc)
3:50 – 4:40 pm	Keynote Speaker	Dr. Karin Musier-Forsyth (The Ohio State University)
4:40 – 5:10 pm	Alumni Career Panel	Britta Rued Brady Strittmatter Chris Schlicksup Frank Roushar
5:10 – 6:30 pm	*Poster Session/Snacks/Social Time*	Presenters K-Z (first name)
6:30 – 6:50 pm	**Closing Remarks/Survey**	Dr. Giedroc/Dr. Lewis

Catering is provided by One World Catering.

Keynote Speakers

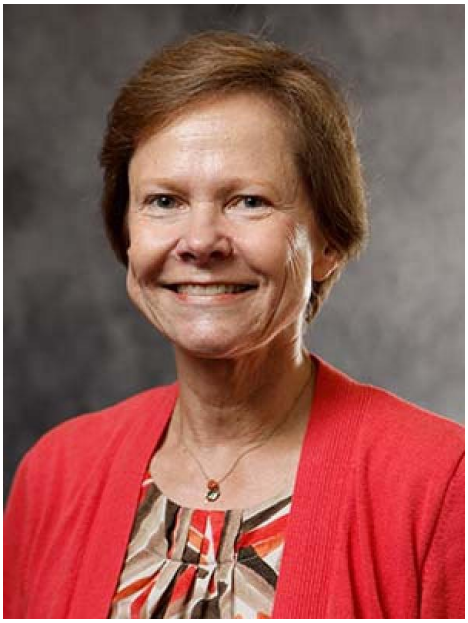


Dr. Jeremy Baskin

Department of Chemistry and Chemical Biology and Weill Institute for Cell and Molecular Biology
Cornell University

Imaging and Editing the Lipidome

Phospholipids are the major constituents of cellular membranes and also important signaling molecules. Because these hydrophobic metabolites are not directly genetically encoded, their detection and precise manipulation with traditional genetic methods is challenging. Therefore, chemical methods for detecting the biosynthesis and intracellular transport of lipids, as well as those for modulating their levels with a high degree of spatiotemporal control, are urgently needed. I will highlight our latest advances in applying bioorthogonal chemistry, activity-based imaging, protein engineering, directed evolution, and optogenetics toward the development of small molecule-based tools for visualizing phospholipid biosynthesis and interorganelle transport. As well, I will describe light-controlled enzymes termed membrane editors for precise manipulation of the lipid composition of target organelle membranes in live cells, with a focus throughout on strategies for tool development and biological applications to reveal insights into regulation of lipid metabolism, transport, and signaling.



Dr. Karin Musier-Forsyth

Department of Chemistry and Biochemistry
Centers for Retrovirus Research and RNA Biology
The Ohio State University

How HIV-1 RNA fate is determined: A tale of two Gs

HIV-1, the causative agent of AIDS, is a retrovirus that packages two copies of unspliced viral RNA as a dimer into newly budding virions. The unspliced viral RNA also serves as an mRNA template for translation of two polyproteins. Recent studies suggest that the fate of the viral RNA (genome or mRNA) is determined at the level of transcription. RNA polymerase II uses heterogeneous transcription start sites to generate major transcripts that differ in only two guanosines at the 5′ end. Remarkably, this two-nucleotide difference is sufficient to alter the structure of the 5′-untranslated region and generate two pools of RNA with distinct functions. The presence of both RNA species is needed for optimal viral replication and fitness.

Poster presentations (alphabetical)

Amardeep Kumar (Lewis)
B12 dependent enzyme: A new platform for non-native catalysis
Kumarama@iu.edu

§ **Andrew Bach** (Snaddon)
Fluorinated analogs of neurotransmitters and other valuable biological building blocks
Acbach@iu.edu

§ **Averi McFarland** (Winkler)
Linking peptidoglycan elongation to metabolism in Streptococcus pnemoniae D39
Avemcfar@iu.edu

*** Basia Walenkiewicz** (VanNieuwenhze)
Expanding Fluorescent Amino Acids Toolbox to Study Bacterial Cell Walls
bwalenk@iu.edu

Batul Shakir (Vazquez)
Optimizing the current-flux of flavin redox reaction for bioelectrosynthetic applications
Bshakir@iu.edu

Bidisha Biswas (Vazquez)
Sensing cholesterol-induced rigidity in model membranes with time-resolved fluorescence spectroscopy and microscopy
Bibiswas@iu.edu

Cayla Rose/Grace Abell (Dann)
Identification and characterization of tyrosine sulfation mediated by human tyrosylprotein sylfotransferases
Cayrose@iu.edu

Chase Mullins (Van Kessel)
Bioluminescence is regulated by nutrient and population signals in Vibrio campbelli
Mullich@iu.edu

Dhari Shah (Vazquez)
Sensing cholesterol-induced rigidity in model membranes with time-resolved fluorescence spectroscopy and microscopy
Dcshah@iu.edu

Dimagi Dias (Choi)
Structure of enterovirus cloverleaf RNA in complex with viral proteinase 3C (3Cpro)
Sodias@iu.edu

Disnie Ranathunga (Morais)
Genome packaging of phage lambda
Atranath@iu.edu

Dorian Dale (Tracey)
Genetic Screen for Proprioceptor Morphology and Function
Dorjdale@iu.edu

Elizabeth Ruscitti (Jacobson)
Inertial fluidics for the continuous separation of microscale particles and bacteria
Elrusc@iu.edu

Emma Lamb (Hundley)
Seeking feedback on single-molecule RNA studies
Ealamb@iu.edu

Emily Erdmann (Hundley)
Investigating the roles of ADARs and A-toI RNA editing in the C. elegans germline
Emierdma@iu.edu

Hanin Sarhan (Cook)
Copper mediated (Bis) trifluoromethylation-cyclization cascade reaction
Hsarhan@iu.edu

Jane Joncha (Jacobson)
Utilizing transposon mutagenesis and fluorescence microscopy for constitutive fluorescent labels in B. subtillis
Jjoncha@iu.edu

Jerricho Tipo (Choi)
Conformational checkpoints regulate the oligomerization of Rev Response Element (RRE) in HIV-1
Jtipo@iu.edu

John Getson (Snaddon)
Stereoselective photoredox/palladiumm cocatalysis
Jcgetson@iu.edu

Joseph Rocchio (Giedroc)
Characterization of a putative Zn metallochaperone and its impact on cell wall biosynthesis in Acinetobacter baumannii
Jsrocchi@iu.edu

Katherine Legg (Giedroc)
Investigating the chemistry and function of ergothioneine in bacterial physiology and oxidative stress
Kalegg@iu.edu

Kristen White (Dragnea)
Accessing the internal protein sites in a viral capsid through a two-step bioconjugation strategy
Kw98@iu.edu

Laura Lastra (Jacobson)
Parallels between negative Z-ring regulators, EzrA and MinD, on Z-ring dynamics
Lalastra@iu.edu

Luana de Assis (Hohmann)
Inhibition of GABA-AT with OV329 reverses pathological nociception in rodents
Ludeassis@iu.edu

Lydia Borjon (Tracey)
Multiple mechanisms of action of an extremely painful venom
Lhoffsta@iu.edu

*** Morgan Nyman** (Dann)
Understanding cellular modification of de novo purine synthesis inhibitors: Impact of folylpolyglutamate synthetase (FPGS) on the action of cancer therapeutics
Monyman@iu.edu

Navin Dayantha Gamage (Yu)
Quantitative, super-resolution imaging of the uptake and intracellular fate of lipid nanoparticles
Ndgamage@iu.edu

Octavio Origel (Morais)
Biophysical characterization of phage 329 genome packaging motor
Oorigel@iu.edu

Payal Payal and Sandip Kumar Mishra (Lewis)
Exploring protein scaffolds to develop artificial metalloenzymes for selective photocatalysis
Apayal@iu.edu Skmishra@iu.edu

Sarah O'Keefe (Clemmer)
Advances in mass spectrometry-based instrumentation for analysis of structure in biological systems
Saokeef@iu.edu

Soniya Quick (Gerdt)
Chemokinesis by a predator of human pathogen
Srayi@iu.edu

Swapnil Singh (Thielges)
Site-specific CD probe at anomeric center monitored to unravel the conformational dynamics of glucose anomers using 1D and 2D IR spectroscopy
Swsingh@iu.edu

Tanmaya Rasal (Van Kessel)
A thiophenesulfonamide binds Vibrio vulnificus SmcR and promotes its degradation
Trassal@iu.edu

Taylor Hausman (Dann)
Defining mechanisms of folate and antifolate transport by folate receptors
Thausman@iu.edu

Tongyun Zhao (Cook)
Copper mediated (bis)trifluoromethylation-cyclization cascade reaction
Tozhao@iu.edu

Yona Liu (Winkler)
Defining the biophysical dynamics and roles of class A penicillin-binding proteins in Streptococcus pneumoniae D39
Ycliu@iu.edu

Zach Celentano (Van Kessel)
Determination of putative degron in the N-terminus of master quorum sensing regulator SmcR
Zcelenta@iu.edu

*Immediate past QCB Ambassadors (2023-2024), primary retreat organizers, and moderators
§Current academic year QCB Ambassadors (2024-2025)