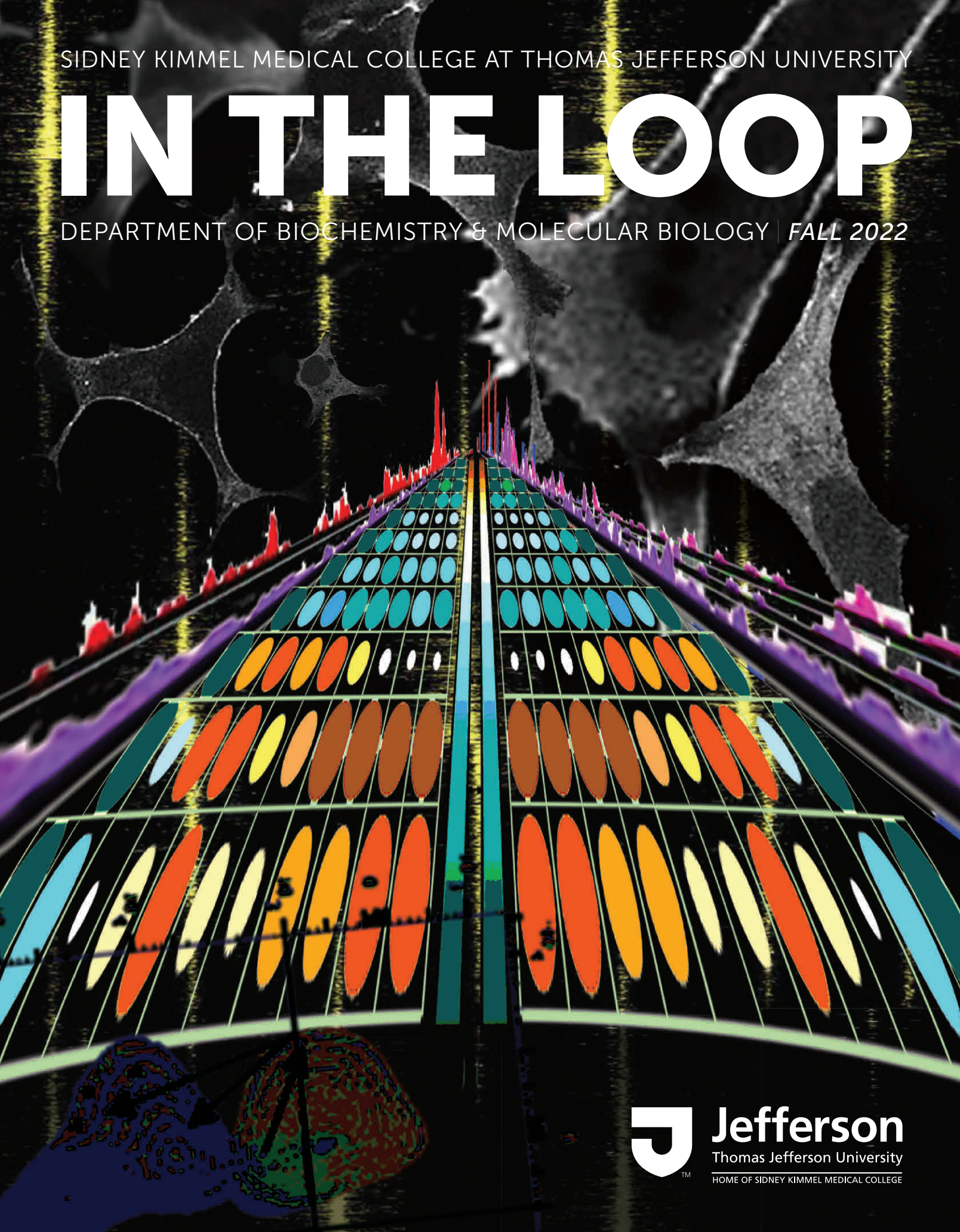


SIDNEY KIMMEL MEDICAL COLLEGE AT THOMAS JEFFERSON UNIVERSITY

IN THE LOOP

DEPARTMENT OF BIOCHEMISTRY & MOLECULAR BIOLOGY | FALL 2022



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Thomas Jefferson University

HOME OF SIDNEY KIMMEL MEDICAL COLLEGE



From the Chair

Like all our previous newsletters, this one covers events and accomplishments of faculty, staff and trainees within the Department of Biochemistry and Molecular Biology. Important stuff to be sure, since scientific progress doesn't happen spontaneously. It depends on dedicated individuals, like those who comprise our Department. That said, what we are most proud of as scientists, is not the awards or promotions or titles or degrees or grants. It is the scientific advances themselves. These advances only become meaningful to us, and of value to society, after they have been subjected to peer review and then published in the scientific literature. By this metric we have had a tremendous year.

Later in this issue you will see a listing of just some of our publications from 2021 and 2022. With all the other news and accomplishments you can read about in these pages, you could easily gloss over or even miss this somewhat esoteric list. But please know that these discoveries, now vetted by peer review and published in some of the most prestigious biomedical journals, are our real contribution, our true legacy, and our most satisfying source of pride as scientists.

Please enjoy this newsletter and feel free to contact me with any thoughts it provokes.

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Steven B. McMahon, PhD

Professor and Chair

Dept. of Biochemistry & Mol. Biology

Senior Associate Dean

Basic Science Research
Sidney Kimmel Medical College

Senior Associate Provost

Thomas Jefferson University

Thomas Jefferson University Department of Biochemistry and Molecular Biology

Steven B. McMahon, PhD

Professor and Chair

Dept. of Biochemistry & Mol. Biology

Senior Associate Dean

Basic Science Research

Sidney Kimmel Medical College

Senior Associate Provost

Thomas Jefferson University

Peter Ronner, PhD

Professor and Vice Chair for Education

Gino Cingolani, PhD

Professor and Vice Chair for Research

Diane E. Merry, PhD

*Professor and Vice Chair for Faculty
Development and Engagement*

Emad Alnemri, PhD

Thomas Eakins Professor

Teresa Fernandes-Alnemri, PhD

Research Assistant Professor

Jeffrey L. Benovic, PhD

Thomas Eakins Professor

Erik W. Debler, PhD

Assistant Professor

Miki Fujioka, PhD

Instructor

Howard Gampfer Jr., PhD

Research Assistant Professor

Lin Guo, PhD

Assistant Professor

Megumi Hamasaki, PhD

Instructor

Ya-Ming Hou, PhD

Professor

Fadia Ibrahim, PhD

Assistant Professor

James Jaynes, PhD

Professor

James H. Keen, PhD

Professor Emeritus

Yohei Kirino, PhD

Associate Professor

Ravi Kumar Lokareddy, PhD

Instructor

Isao Masuda, PhD

Instructor

Alexander M. Mazo, PhD

Professor

Svetlana Petruk, PhD

Research Assistant Professor

Anna Pluciennik, PhD

Assistant Professor

Richard Pomerantz, PhD

Associate Professor

Charles P. Scott, PhD

Assistant Professor

Michael Soniat, PhD

Assistant Professor

Dmitry Temiakov, PhD

Associate Professor

Philip B. Wedegaertner, PhD

Professor

Eric Wickstrom, PhD

Professor

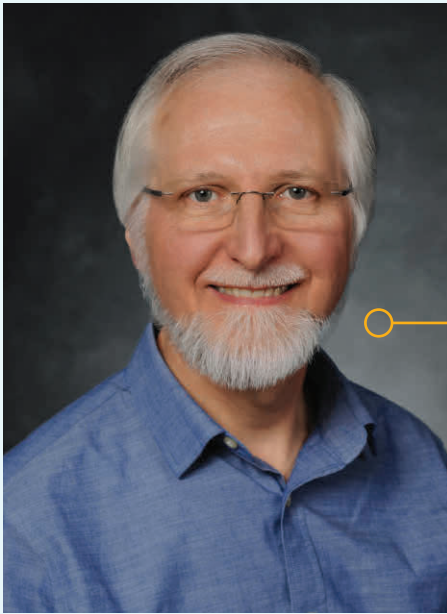
Edward Winter, PhD

Professor



Recent Awards and Honors

The Department of Biochemistry and Molecular Biology members garnered multiple awards in recognition of their research and educational accomplishments during the 2021-2022 academic year.



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TEACHING AWARD

Peter Ronner, PhD,

Received Thomas J. Nasca, MD Award for Distinguished Teaching & Dedication to Student Medical Education from the Sidney Kimmel Medical College



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NAMED ADVISORY BOARD CHAIR

Diane E. Merry, PhD, Named Chair of The Scientific Advisory Board for the Vickie & Jack Farber Institute for Neuroscience at Jefferson



LEADERSHIP

Diane Merry, PhD, Led neurodegeneration symposia *Global Momentum: Bringing the Kennedy's Disease Community Together*

more >



Recent Awards and Honors



FELLOWSHIP

Jeffrey L. Benovic, PhD, Named a Fellow of The American Society for Biochemistry & Molecular Biology



RESEARCH AWARD

Richard Pomerantz, PhD, Received The Catalyst Award from The Falk Medical Research Trust. Project title: "PROTACs for Targeting BRCA-Deficient Cancers"

BOARD APPOINTMENT

Richard Pomerantz, PhD, Appointed to Editorial Board of "DNA Repair"



TEACHING AWARD

Diane E. Merry, PhD, Received The Sidney Kimmel Medical College Faculty Mentorship Award from Dean Mark Tykocinski, MD

GRANT RECIPIENT

Yohei Kirino, PhD, Awarded "Role of rRNA-derived short non-coding RNAs in innate immune response," "Role of Toll-like receptor-induced short noncoding RNAs in innate immune response" two R21 grants from The National Institute of Allergy and Infectious Diseases at NIH



FELLOWSHIP

Ashutosh Phadte, PhD, Postdoctoral Fellow in the Pluciennik lab, awarded Fellowship from The Hereditary Disease Foundation. Project title: "Oxidative damage and CAG expansions in Huntington's Disease"



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GRANT RECIPIENT

Anna Pluciennik, PhD, Assistant Professor, Awarded Hereditary Disease Foundation Grant. Project title: "Crosstalk between DNA repair pathways in Huntington's disease"



GRANT RECIPIENTS

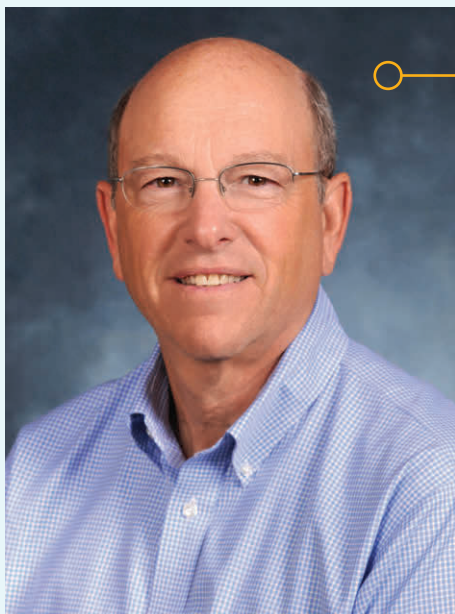
Emad Alnemri, PhD, and **Andrew Aplin, PhD**, Received R01 grant from NIH. Project title: "Mechanisms of cell death in cutaneous melanoma"

[more >](#)



Recent Awards and Honors

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APPOINTMENT

James H. Keen, PhD,
Appointed Professor
Emeritus



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NIH AWARDS

Gino Cingolani, PhD, and **Lin Guo, PhD,**
Received MIRA Awards from NIH. Dr. Cingolani's
Project title: "Mechanism of Viral Genome
Delivery into Cells." Dr. Guo's Project title:
"Elucidating the Mechanism in the Regulation
of RNA-binding Protein Phase Separation"

IDEA AWARD

Philip Wedegaertner, PhD,
Received DoD Idea Award.
Project title: "Targeting
the Interaction of G Beta-
Gamma and Mutant G Alpha
q/11 in Uveal Melanoma"





The Department of Biochemistry and Molecular Biology extends a warm welcome to new faculty members.

RICHARD POMERANTZ, PHD,
APPOINTED ASSOCIATE PROFESSOR



Richard Pomerantz, PhD has been appointed as an Associate Professor of Biochemistry and Molecular Biology. Dr. Pomerantz joined our Department from Temple University, where he had been a faculty member since 2013. Prior to this, Dr. Pomerantz earned his PhD in Molecular and Cellular Biology at SUNY-Downstate and conducted postdoctoral research at Rockefeller University.

Dr. Pomerantz's research focuses on a family of enzymes that repair DNA damage in our genomes. Perturbations in these enzymes, termed DNA polymerases, lead to cancer, developmental disorders, and neurodegenerative diseases. Dr. Pomerantz is also the Co-Founder and CSO of Recombination Therapeutics LLC, a biotechnology company that translates basic science discoveries into new therapies for cancer patients. He holds several patents related to these efforts.

Research in the Pomerantz laboratory has been funded by the NIH, DOD, Leukemia and Lymphoma Society, American Association for Cancer Research, US-Israel Binational Science Foundation, and several other agencies. In addition, Dr. Pomerantz has been recognized by awards from the Bassler Center for BRCA, Mary Kay Foundation, American Society of Biochemistry and Molecular Biology, Biophysical Society, American Society for Microbiology, and NASA.

Bluemle Life Sciences Building
233 S. 10th Street, Room 915
Philadelphia, PA 19107
Richard.Pomerantz@Jefferson.edu

FADIA IBRAHIM, PHD,
APPOINTED ASSISTANT PROFESSOR



Fadia Ibrahim, PhD has been appointed as an Assistant Professor of Biochemistry and Molecular Biology. Dr. Ibrahim joined our Department from the University of Pennsylvania, where she was a Senior Research Investigator. Prior to joining the University of Pennsylvania, Dr. Ibrahim earned her degree in Molecular Biology at the University of Nebraska-Lincoln. Dr. Ibrahim is a leading expert in RNA, genomics and high-throughput sequencing techniques. She developed the Akron-Seq and Akron-SMRT methods, which allowed her to uncover a novel mechanism of co-translational, ribosome-phased, decay of human mRNAs. Dr. Ibrahim has termed this new mechanism 'ribothrypsis'. Her research also focuses on understanding the molecular mechanism by which RNA-binding proteins contribute to the pathogenesis of amyotrophic lateral sclerosis (ALS). This work has led to the discovery of previously unknown ALS candidate genes TAF15 and EWSR1 and the identification of in vivo neuronal RNA targets of TAF15. During her career, Dr. Ibrahim has also identified previously unknown roles of several RNA species in normal cellular functions, and discovered a novel poly(A) polymerase required for targeting mRNA degradation in the RNA interference pathway.

Jefferson Alumni Hall
1020 Locust Street, Room 411H
Philadelphia, PA 19107
Fadia.Ibrahim@Jefferson.edu

ANNA PLUCIENNIK, PHD,
APPOINTED ASSISTANT PROFESSOR



Anna Pluciennik, PhD has been appointed as an Assistant Professor of Biochemistry and Molecular Biology. Dr. Pluciennik has extensive expertise in all aspects of CAG triplet repeat expansion, a genetic alteration, associated with a variety of human conditions. Dr. Pluciennik earned her PhD in Biology from the University of Lodz, where she studied E. Coli to understand the mechanisms of CAG repeat expansion and demonstrated that strand slippage during DNA replication underlies the expansion of triplet repeats. While conducting postdoctoral research at Texas Agricultural and Mechanical University, Dr. Pluciennik provided the first evidence that the genomic regions containing stretches of triplet repeats are prone to aberrant DNA recombination. Further postdoctoral work with Nobel Laureate Paul Modrich, PhD at Duke University, led to important discoveries that explained how DNA mismatch repair enzymes are able to distinguish the damaged DNA strand from the wild-type allele.

Dr. Pluciennik's research focuses on understanding the mechanisms that underlie somatic CAG repeat instability and determining how expansions lead to disease pathology. Her recent research has been published in PNAS, The Journal of Huntington's Disease and The Journal of Clinical Investigation. Her research is funded by the National Institutes of Health and the Gies Foundation.

Jefferson Alumni Hall
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Anna.Pluciennik@Jefferson.edu

Welcome to New BMP Students

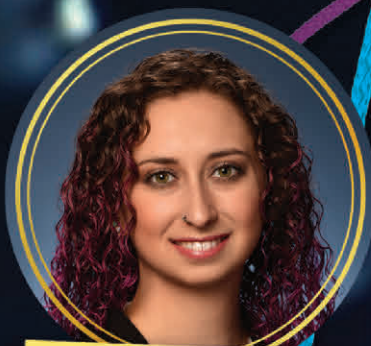
2021



Brittany Morgan Mahon
Undergraduate Institution:
Stockton University
Hometown: Hammonton, NJ
Research Interests: Protein
Biochemistry, Cancer Biology,
Infectious Disease.
Outside of the lab, I enjoy
playing guitar, working out,
writing poetry, and listening to
music.



Anne Londregan
Undergraduate Institution:
Boston University
Mount Laurel, NJ
Research Interests:
Gut-brain axis and Cell
signaling pathways
Outside of the lab, I enjoy
hiking, running, cycling,
and knitting.



Candice Bizzaro
Undergraduate Institution:
Temple University
Hometown: North Wales, PA
Research Interests: Cancer
Therapeutics, Metalloredutase
as a Therapeutic Target,
Prostate Cancer
I enjoy spending my free time
outside bike riding, rock
climbing and snowboarding.



Genevieve Lewis
Undergraduate Institution:
Columbia University
Hometown:
Croton-on-Hudson, NY
Research Interests:
Infectious diseases, Signaling
pathways, Innate immunity
Outside the lab, I enjoy
drawing, painting, and
cross-country biking.



Viktoriia Sokolova
Undergraduate Institution:
Drexel University
Hometown: Kiev, Ukraine
Research Interests: Drug
Design, Protein Structure and
Function, Neurodegeneration
Outside the lab, I enjoy hiking,
taking photos of landscapes,
reading, playing piano and
Djembe drum.



Hailey Shankle
Undergraduate Institution:
University Of The Sciences
Hometown: Pottstown, PA
Research Interests: Cancer
Biology, Molecular Biology,
Pharmacology.
Outside the lab, I enjoy
propagating plants, playing
video games, and snuggling my
cross-eyed cat named Adam
Goldberg.



Henri McGuigan
Undergraduate Institution:
McGill University
Hometown: Haddonfield, NJ
Research Interests: Cell and
Molecular Biology,
Microbiology.
Outside the lab I like to read,
spend time with friends and
family, watch hockey and
football, and go for hikes.

Welcome to New BMP Students

2022



Emily Kurtyan
Undergraduate Institution:
Rowan University
Hometown: Philadelphia, PA
Drug Discover, Receptor Drug
Interactions,
Neuroinflammation
I am an avid reader and am
always happy to share book
recommendations!



Anthony Monte Carlo
Undergraduate Institution:
Rutgers University
Hometown: West Deptford,
NJ
Research Interests: DNA
nanotechnology, protein
structure, virology
In my free time, I enjoy
working on my car!



Sarah Barndt
Undergraduate Institution:
University of Delaware
Hometown: Wilmington, DE
Research Interests: Cell
Signaling and Protein-Protein
Interactions
Outside of the lab I enjoy
hiking, baking, wine tasting,
and playing hollow knight.



Ian Mawn
Undergraduate Institution:
Bucknell University
Hometown: Spring Lake, NJ
Research Interests: Protein
Biochemistry and Structural
Biology
I enjoy going to the beach,
playing guitar, and cooking.



Jacquelyn DePierro
Undergraduate Institution:
Rowan University
Hometown: Madison, NJ
Research Interests:
Neuropharmacology, Drug
Discovery, Molecular Biology,
Cell Signaling
Outside of the lab, I like to go
to the beach, exercise, hike, ski,
cook, craft, and play board
games.



Casey Durso
Undergraduate Institution:
Lehigh University
Hometown: Yardley, PA
Research Interests: Drug
Discovery in
Neurodegenerative Diseases
I spend my time outside of lab
singing and songwriting,
binging the latest comedies,
enjoying movie nights and live
music with friends.



William Auerbacher
Undergraduate Institution:
University of Delaware
Hometown: Clinton, NJ
Research
Interests: Cardiovascular
Disease and Cell Signaling
My interests include skiing,
chess and basketball.

2021 FACULTY PUBLICATIONS (Selected from 41 total)

Chloride sensing by WNK1 regulates NLRP3 inflammasome activation and pyroptosis. Mayes-Hopfinger L, Enache A, Xie J, Huang CL, Köchl R, Tybulewicz VLJ, Fernandes-Alnemri T, **Alnemri ES**. *Nat Commun*. 2021;12(1):4546.

Structure of a GRK5-Calmodulin Complex Reveals Molecular Mechanism of GRK Activation and Substrate Targeting. Komolov KE, Sulon SM, Bhardwaj A, van Keulen SC, Duc NM, Laurinavichyute DK, Lou HJ, Turk BE, Chung KY, Dror RO, **Benovic JL**. *Mol Cell*. 2021;81(2):323-339.e11.

Cryo-EM structure of the periplasmic tunnel of T7 DNA-ejectosome at 2.7 Å resolution. Swanson NA, Lokareddy RK, Li F, Hou CD, Leptihn S, Pavlenok M, Niederweis M, Pumroy RA, Moiseenkova-Bell VY, **Cingolani G**. *Mol Cell*. 2021;81(15):3145-3159.e7.

Karyopherin-βs play a key role as a phase separation regulator. Yoshizawa T, **Guo L**. *The Journal of Biochem*. 2021;170(1):15-23.

Insights into genome recoding from the mechanism of a classic +1-frameshifting tRNA. Gamper H, Li H, Masuda I, Miklos Robkis D, Christian T, Conn AB, Blaha G, Petersson EJ, Gonzalez RL Jr, **Hou YM**. *Nat Commun*. 2021;12(1):328.

Loss of N1-methylation of G37 in tRNA induces ribosome stalling and reprograms gene expression. Masuda I, Hwang JY, Christian T, Maharjan S, Mohammad F, Gamper H, Buskirk AR, **Hou YM**. *Elife*. 2021;10:e70619.

Twice exploration of tRNA +1 frameshifting in an elongation cycle of protein synthesis. Gamper H, Mao Y, Masuda I, McGuigan H, Blaha G, Wang Y, Xu S, **Hou YM**. *Nucleic Acids Res*. 2021;49(17):10046-10060.

An insulator blocks access to enhancers by an illegitimate promoter, preventing repression by transcriptional interference. Fujioka M, Nezdzyr A, **Jaynes JB**. *PLoS Genet*. 2021;17(4):e1009536.

RNase κ promotes robust piRNA production by generating 2',3'-cyclic phosphate-containing precursors. Shigematsu M, Kawamura T, Morichika K, Izumi N, Kiuchi T, Honda S, Pliatsika V, Matsubara R, Rigoutsos I, Katsuma S, Tomari Y, **Kirino Y**. *Nat Commun*. 2021;12(1):4498.

The SAGA complex regulates early steps in transcription via its deubiquitylase module subunit USP22. Stanek TJ, Gennaro VJ, Tracewell MA, Di Marcantonio D, Pauley KL, Butt S, McNair C, Wang F, Kossenkov AV, Knudsen KE, Butt T, Sykes SM, **McMahon SB**. *EMBO J*. 2021;40(16):e102509.

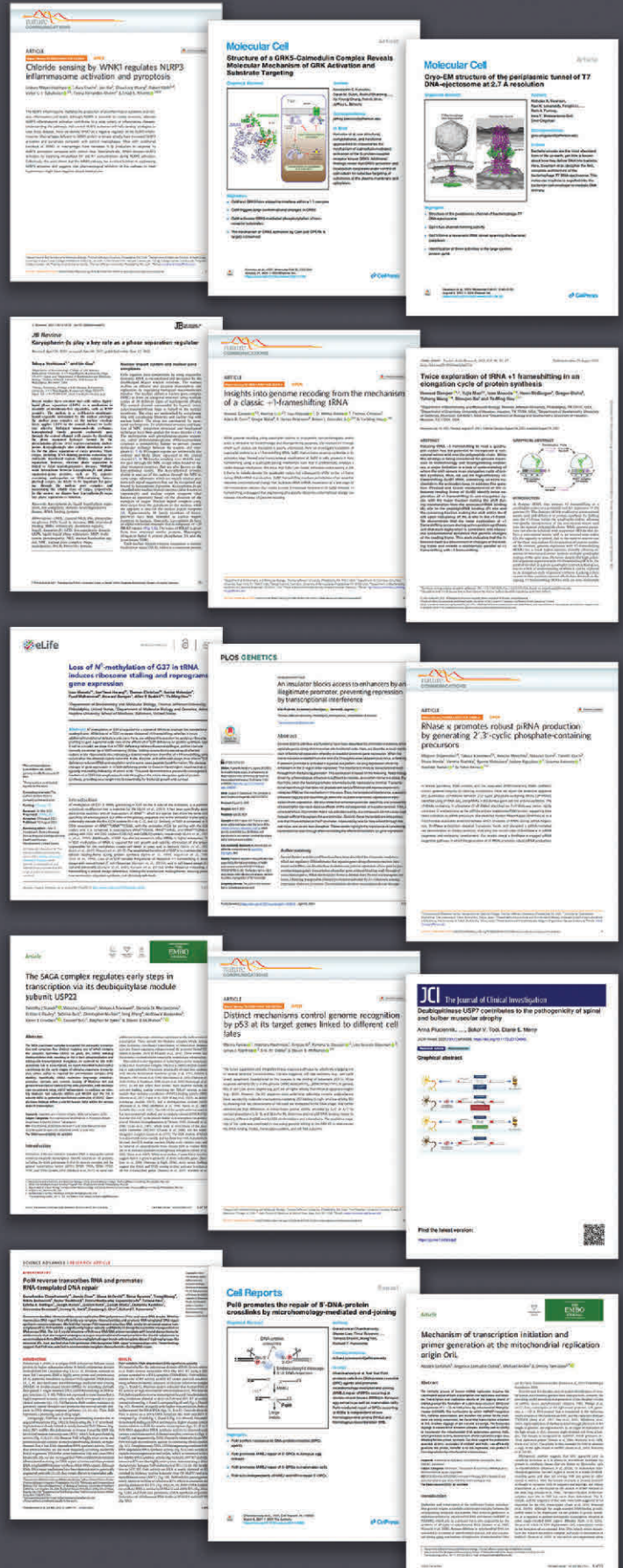
Distinct mechanisms control genome recognition by p53 at its target genes linked to different cell fates. Farkas M, Hashimoto H, Bi Y, Davuluri RV, Resnick-Silverman L, Manfredi JJ, **Debler EW, McMahon SB**. *Nat Commun*. 2021;12(1):484.

Deubiquitinase USP7 contributes to the pathogenicity of spinal and bulbar muscular atrophy. Pluciennik A, Liu Y, Molotsky E, Marsh GB, Ranxhi B, Arnold FJ, St-Cyr S, Davidson B, Pourshafie N, Lieberman AP, Gu W, Todi SV, **Merry DE**. *J Clin Invest*. 2021;131(1):e134565.

Poiθ reverse transcribes RNA and promotes RNA-templated DNA repair. Chandramouly G, Zhao J, McDevitt S, Rusanov T, Hoang T, Borisonnik N, Treddinick T, Lopezcolorado FW, Kent T, Siddique LA, Mallon J, Huhn J, Shoda Z, Kashkina E, Brambati A, Stark JM, Chen XS, **Pomerantz RT**. *Sci Adv*. 2021;7(24):eabf1771.

Poiθ promotes the repair of 5'-DNA-protein crosslinks by microhomology-mediated end-joining. Chandramouly G, Liao S, Rusanov T, Borisonnik N, Calbert ML, Kent T, Sullivan-Reed K, Vekariya U, Kashkina E, Skorski T, Yan H, **Pomerantz RT**. *Cell Rep*. 2021;34(10):108820.

Mechanism of transcription initiation and primer generation at the mitochondrial replication origin OriL. Sarfallah A, Zamudio-Ochoa A, Anikin M, **Temliakov D**. *EMBO J*. 2021;40(19):e107988.



Inability to switch from ARID1A-BAF to ARID1BBAF impairs exit from pluripotency and commitment towards neural crest formation in ARID1B-related neurodevelopmental disorders. Pagliaroli L, Porazzi P, Curtis AT, Scopa C, Mikkers HMM, Freund C, Daxinger L, Deliard S, Welsh SA, Offley S, Ott CA, Calabretta B, Brugmann SA, Santen GWE, **Trizzino M**. *Nat Commun*. 2021;12(1):6469.

GBy regulates mitotic Golgi fragmentation and G2/M cell cycle progression. Rajanala K, Klayman LM, **Wedegaertner PB**. *Mol Biol Cell*. 2021;32(20):br2.



2022 FACULTY PUBLICATIONS (Selected, Year To Date)

B2 -Adrenoceptor agonist profiling reveals biased signalling phenotypes for the B2 -adrenoceptor with possible implications for the treatment of asthma. De Pascali F, Ippolito M, Wolfe E, Komolov KE, Hopfinger N, Lemenze D, Kim N, Armen RS, An SS, Scott CP, **Benovic JL**. *Br J Pharmacol*. Published online 2022. doi: 10.1111/bph.15900.

Differential recognition of canonical NF- κ B dimers by Importin α 3. Florio TJ, Lokareddy RK, Yeggoni DP, Sankhala RS, Ott CA, Gillilan RE, **Cingolani G**. *Nat Commun*. 2022;13(1):1207.

A periplasmic cinched protein is required for siderophore secretion and virulence of *Mycobacterium tuberculosis*. Zhang L, Kent JE, Whitaker M, Young DC, Herrmann D, Aleshin AE, Ko YH, **Cingolani G**, Saad JS, Moody DB, Marassi FM, Ehrt S, Niederweis M. *Nat Commun*. 2022;13(1):2255.

Cryo-EM Structure of a Kinetically Trapped Dodecameric Portal Protein from the Pseudomonas-phage PaP3. David Hou CF, Swanson NA, Li F, Yang R, Lokareddy RK, **Cingolani G**. *J Mol Biol*. 2022;434(9):167537.

Recognition of the TDP-43 nuclear localization signal by importin α 1/ β . Doll SG, Meshkin H, Bryer AJ, Li F, Ko YH, Lokareddy RK, Gillilan RE, Gupta K, Perilla JR, **Cingolani G**. *Cell Rep*. 2022;39(13):111007.

Genome Expansion by tRNA +1 Frameshifting at Quadruplet Codons. Gamper H, Masuda I, **Hou YM**. *J Mol Biol*. 2022;434(8):167440.

Making Invisible RNA Visible: Discriminative Sequencing Methods for RNA Molecules with Specific Terminal Formations. Shigematsu M, **Kirino Y**. *Biomolecules*. 2022;12(5):611.

Targeting Chemotherapy to Decondensed H3K27me3-Marked Chromatin of AML Cells Enhances Leukemia Suppression. Porazzi P, Petruk S, Pagliaroli L, De Dominicis M, Deming D 2nd, Puccetti MV, Kushinsky S, Kumar G, Minieri V, Barbieri E, Deliard S, Grande A, **Trizzino M**, Gardini A, Canaani E, Palmisiano N, Porcu P, Ertel A, Fortina P, Eischen CM, **Mazo A**, Calabretta B. *Cancer Res*. 2022;82(3):458-471.

Neuromuscular junction pathology is correlated with differential motor unit vulnerability in spinal and bulbar muscular atrophy. Molotsky E, Liu Y, Lieberman AP, **Merry DE**. *Acta Neuropathol Commun*. 2022;10(1):97.

Mechanisms of mitochondrial promoter recognition in humans and other mammalian species. Zamudio-Ochoa A, Morozov YI, Sarfallah A, Anikin M, **Temiakov D**. *Nucleic Acids Res*. 2022;50(5):2765-2781.

Positive Selection and Enhancer Evolution Shaped Lifespan and Body Mass in Great Apes. Tejada-Martinez D, Avelar RA, Lopes I, Zhang B, Novoa G, de Magalhães JP, **Trizzino M**. *Mol Biol Evol*. 2022;39:369.

Meiotic commitment: More than a transcriptional switch. Rimal A, **Winter E**. *Curr Biol*. 2022;32(7):R320-R322.



Recent Grant Awards

Department faculty secured the following new extramural funding (2020–2022).

PRINCIPAL INVESTIGATOR	SPONSOR	TYPE	AWARD TITLE	TOTAL AWARD
Emad Alnemri, PhD	NIH/NIAMS	R01	Caspase-1 Activation by the Inflammasomes	\$ 2,693,887
Emad Alnemri, PhD	DOD / Drexel University		The Role of GSDME in melanoma brain metastases	\$ 81,630
Emad Alnemri, PhD (with Andrew Aplin, PhD)	NIH/NCI	R01	Mechanisms of cell death in cutaneous melanoma	\$ 847,553
Diane Merry, PhD and Jeffrey Benovic, PhD	NIH/NIGMS	T32	Training Grant in Cellular, Biochemical and Molecular Sciences	\$ 2,081,445
Gino Cingolani, PhD	Faze Medicines, Inc.		Understanding KaryopherinB1, ImportinA1, and TDP-43 interactions	\$ 466,082
Gino Cingolani, PhD	NIH/NIGMS	R35	Mechanism of Viral Genome Delivery into Cells	\$ 2,649,396
Gino Cingolani, PhD	NIH/OD	S10	A New Cryo-Transmission Electron Microscope at Thomas Jefferson University	\$ 1,969,275
Gino Cingolani, PhD	NIH/NINDS	R21	Protein therapeutics inspired by importins	\$ 429,000
Alexander Mazo, PhD (with Bruno Calabretta, PhD)	NIH/NCI	R01	A novel strategy for transcriptional reprogramming of lymphoid leukemia cells	\$ 1,417,060
Alexander Mazo, PhD (Pre-doctoral fellowship award to David Deming)	NIH/NCI	F31	Inducing transcriptional reprogramming of leukemic B-cells by facilitating transcription factors binding to nascent decondensed chromatin	\$ 92,789
Erik Debler, PhD	NIH/NIAID	R21	Target Validation for I-BET151-Induced Differentiation in the African Trypanosome	\$ 459,483
Erik Debler, PhD	NIH/NIAID	R01	Chromatin Biology of the African Trypanosome	\$ 2,701,111
Howard B. Gamper Jr, PhD	NIH through Columbia University	R01	The structural dynamics of ribosomal frameshifting and ribosome rescue	\$ 208,748
Lin Guo, PhD	Pennsylvania Department of Health (CURE Grant)		Defining Misfolding Mechanisms to Prevent and Reverse hnRNPA1 Aggregation	\$ 313,154
Lin Guo, PhD	NIH/NIGMS	R35	Elucidating the Mechanism in the Regulation of RNA-binding Protein Phase Separation	\$ 1,950,000
Lin Guo, PhD	NIH/NINDS	RF1	Developing RNA Oligonucleotides to Mitigate Abberant FUS Phase Transition in FTD/ALS	\$ 1,170,000
Ya-Ming Hou, PhD	NIH/NIGMS	R35	tRNA in codon usage	\$ 2,411,880
Ya-Ming Hou, PhD	NIH/NHGRI	R21	Exploring 3Dpol for RNA sequencing in real time	\$ 624,000
Ya-Ming Hou, PhD	NIH/NIAID	R01	TrmD-targeting actinobacterial natural products as next generation antibiotics	\$ 4,187,325
Ya-Ming Hou, PhD	NIH through The Jackson Laboratory	U24	Synthetic Control Set for Accurate Nanopore-Based Single-Molecule Detection of RNA Modifications	\$ 73,000
James Jaynes, PhD	NIH/NIGMS	R01	Non-canonical functions of chromatin insulators and Poly-comb-group proteins	\$ 1,248,000
Yohei Kirino, PhD	NIH/NIAID	R21	Role of Toll-like receptor-induced short non-coding RNAs in innate immune response	\$ 429,000
Yohei Kirino, PhD	NIH/NIAID	R21	Role of rRNA-derived short non-coding RNAs in innate immune response	\$ 429,000

PRINCIPAL INVESTIGATOR	SPONSOR	TYPE	AWARD TITLE	TOTAL AWARD
Yohei Kirino, PhD (with Deepak Deshpande, PhD)	NIH/NHLBI	R01	tRNA-derived non-coding RNAs in ASM function and in asthma	\$ 1,304,816
Steven McMahon, PhD	Pennsylvania Department of Health (CURE Grant)		Functional Role of Unique p53 Mutations in Adenocarcinoma of the Lung	\$ 601,576
Anna Pluciennik, PhD	NIH/NINDS	R01	Molecular mechanisms of triplet repeat instability in Huntington's disease	\$ 1,950,000
Anna Pluciennik, PhD	The Gies Foundation		Factors that modulate FAN1 function in Huntington's disease	\$ 750,000
Anna Pluciennik, PhD	NIH/NIGMS	R01	Crosstalk between DNA repair pathways in repeat instability	\$ 1,950,000
Anna Pluciennik, PhD (Post-doctoral fellowship award to Dr. Ashutosh Phadte)	Hereditary Disease Foundation		The role of oxidative stress in CAG triplet repeat expansion in Huntington's disease	\$ 135,320
Richard Pomerantz, PhD	NIH/NIGMS	R01	Mechanisms of RNA-DNA repair	\$ 1,497,308
Richard Pomerantz, PhD	Department of Defense		Targeting Pol-Theta as a Novel Breast Cancer Target	\$ 558,190
Richard Pomerantz, PhD	Recombination Therapeutics, LLC		Next-generation precision medicine for targeting recombination-deficient cancers	\$ 72,449
Richard Pomerantz, PhD	NIH through Recombination Therapeutics, LLC	R41	Nucleotide inhibitors as precision medicine in breast cancer	\$ 100,091
Richard Pomerantz, PhD	Dr. Ralph and Marian Falk Medical Research Trust		PROTACS for targeting BRCA-Deficient Cancers	\$ 300,000
Richard Pomerantz, PhD	Recombination Therapeutics, LLC		Structure based design of Pol-theta inhibitors	\$ 60,999
Richard Pomerantz, PhD (with Tomasz Skorski, MD, Temple University)	NIH through Temple University	R01	PolQ As A Novel Therapeutic Target In AML	\$ 359,917
Richard Pomerantz, PhD	NIH/NIGMS	R01	Structure and Function of DNA Polymerase Theta	\$ 1,038,799
Richard Pomerantz, PhD	NIH/NIGMS	R01	Mechanisms of Mammalian Double-Strand Break Repair	\$ 21,272
Richard Pomerantz, PhD (with Steven Benner, PhD, FfAME, Foundation for Applied Molecular Evolution, Inc.)	NIH through Foundation For Applied Molecular Evolution, Inc	R01	Enzymatic Synthesis of RNA	\$ 692,749
Marco Trizzino, PhD	Mathers Foundation		The ARID1A/ARID1B crosstalk as a central regulator of craniofacial development	\$ 825,000
Marco Trizzino, PhD	NIH/NIGMS	R35	Mechanisms of gene regulation mediated by human-specific SVA transposons	\$ 1,950,000
Philip Wedegaertner, PhD	NIH/NIGMS	R01	Regulation of Mutationally Activated Gq/11	\$ 1,248,000
Philip Wedegaertner, PhD	Department of Defense		Targeting the interaction of G beta-gamma and Mutant G Alpha q/11 in Uveal Melanoma	\$ 468,000
Eric Wickstrom, PhD	CHDI Foundation		Huntington mRNA PET Imaging of Therapeutic Efficacy	\$ 201,769
Edward Winter, PhD	NIH/NIGMS	R01	Non-canonical MAPK signaling in yeast	\$ 1,309,253

Thesis Defenses

The following students earned doctoral degrees as members of Biochemistry and Molecular Biology Department laboratories and/or as members of the Biochemistry and Molecular Pharmacology Program. Thesis advisors and dissertation titles are indicated as well.

NAME	ADVISOR	THESIS TITLE
Benjamin Barnhart	Rajanikanth Vadigepalli, PhD	Partial hepatectomy as a model of liver regeneration: Network-based profiles
Steven Doll	Gino Cingolani, PhD	Recognition of the TDP-43 Nuclear Localization Signal by importin α 1/ β
Emanuela Dylgjeri	Karen Knudsen, PhD	DNA-PK: Novel roles in metabolism and therapeutic targeting in prostate cancer
Marina Farkas	Steven McMahon, PhD	Elucidating Mechanisms Mediating Genome Recognition and Cell Fate Determination by p53
Tyler Florio	Gino Cingolani, PhD	Mechanisms and Regulation of NF- κ B Nuclear Import through Importin isoforms
Michael Ippolito	Jeffrey Benovic, PhD	Selective Activation of G Protein Signaling Through the β 2AR via Novel and Redefined Small Molecule Ligands
Dominic Lapadula	Jeffrey Benovic, PhD	Direct Inhibition of Oncogenic Gq/11 in Uveal Melanoma
Amy Mandigo	Karen Knudsen, PhD	E2F1 and androgen receptor dysregulation drives RB-deficient cancer progression
Lindsey Mayes-Hopfinger	Emad Alnemri, PhD	Identifying WNK1 as a negative regulator of NLRP3 inflammasome activation and pyroptosis
Alison Moss	Rajanikanth Vadigepalli, PhD	Central and peripheral transcriptomic networks driving cardiovascular control
Austin Parrish	Rajanikanth Vadigepalli, PhD	Systems-Level Analysis of Regulatory Networks Involved in Alcoholic Liver Disease
Azadeh Sarfallah	Dmitry Temiakov, PhD	Mechanism of Transcription Initiation and Primer Generation at the Mitochondrial Origin of Replication OriL
Hannah Schapiro	Michael Root, MD, PhD	Dissecting how interactions at the apex of HIV-1 Env modulate epitope exposure at the distance base of the glycoprotein
Sarah Sulon	Jeffrey Benovic, PhD	Regulation of G Protein-Coupled Receptor Kinase 5 by Calmodulin
Nicholas Swanson	Gino Cingolani, PhD	Structure of the prototypical Podophage T7 DNA Ejectosome
Halley Washburn	Matthew Dalva, PhD	Molecular Mechanisms of the EphB-NMDA Receptor Extracellular Interaction
Samantha Brown	Jonathan Brody, PhD	Beyond transcription: studying Human Antigen R (HuR/ELAVL1) and its role in post-transcriptionally regulating the pancreatic cancer-driver, Yes-associated protein 1 (YAP1)
Mai Nguyen	Andrew Aplin, PhD	Optimizing MEK inhibitors in NRAS mutant melanoma - overcoming resistance and combination strategies
Sheera Rosenbaum	Andrew Aplin, PhD	The Role of Lineage-Specific Transcription Factors in Regulating Anti-Tumor Immune Responses in Melanoma

2022 Biochemistry and Molecular Biology Retreat



The 2022 Department of Biochemistry and Molecular Biology Retreat was held on September 16, 2022, at the Museum of the American Revolution on Independence Mall. The event opened with Dr. McMahon providing an update on the “State of the Department,” which was followed by a full day of seminars and poster presentations by faculty, students and fellows. Participants also had the opportunity to access to the Museum’s renowned collection and exhibits. Over 110 individuals attended the event.



Retreat Planning Committee



Philip Wedegaertner, PhD



Anna Pluciennik, PhD



Yohei Kirino, PhD



Eneida Nieves

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Philadelphia, PA 19107

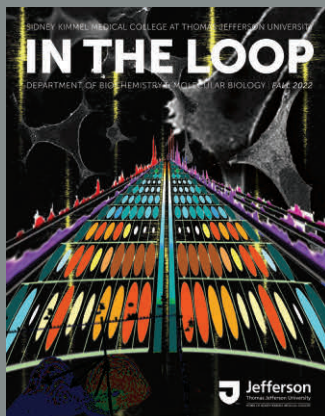
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ON THE COVER

Images compiled from recent publications by members of the Department of Biochemistry and Molecular Biology - *Structure of a GRK5-Calmodulin Complex Reveals Molecular Mechanism of GRK Activation and Substrate Targeting: PMID 33321095* (Jeffrey Benovic, Ph.D.), *RNase K promotes robust piRNA production by generating 2',3'-cyclic phosphate-containing Precursors: PMID 3430193* (Yohei Kirino, Ph.D.), *The SAGA complex regulates early steps in transcription via its deubiquitylase module subunit USP22: PMID 3415658* (Steven McMahon, Ph.D.), *Inability to switch from ARID1A-BAF to ARID1BBAF impairs exit from pluripotency and commitment towards neural crest formation in ARID1B-related neurodevelopmental disorders: PMID 34753942* (Marco Trizzino, Ph.D.). Graphics were manipulated and assembled into the cover image by Julia Kay, BFA.



2021 BMB Retreat



The 2021 Department of Biochemistry and Molecular Biology Retreat was held on June 25, 2021 via Zoom, in accordance with COVID-19 safety guidelines.

The event was attended by 160 individuals, with presentations from faculty, fellows and students. The Keynote Speaker for the Retreat was Dr. Kelly Nguyen (above), Principal Investigator at The Medical Research Council Laboratory of Molecular Biology, Cambridge, UK. Dr. Nguyen's lecture was entitled "Replenishing the ends: Visualization of human telomerase holoenzyme by cryo-EM." Special thanks to the Retreat Planning Committee, speakers, and attendees for helping to make this a successful event.

To support the research and education missions of the Department of Biochemistry and Molecular Biology, please visit [Giving.Jefferson.edu](https://www.giving.jefferson.edu) (enter "Biochemistry Dept." in the notes section).