

The [CATALYST]



[News & Announcements]

Congrats!! to Biochemistry alumnus **Daniel Murphy** for receiving an F32 postdoctoral fellowship entitled "Elucidating the cis-regulatory architecture of retinal bipolar cells", funded by the NEI. The main goal of the research project is to profile the transcriptome and to map the open chromatin of bipolar cells isolated from the mouse retina.

.....

Abigail Moya defended her dissertation, entitled "ARL2BP, a Novel Cilopathy Protein, is Required for Cilia Microtubule Formation" on Friday, November 16, 2018, in the presence of friends, colleagues and faculty members, along with her mentor, Dr. Visvanathan Ramamurthy. *Congratulations Abi, on a job well done!*

.....

Frisch Lab's paper been accepted to Molecular Immunology, with no revisions:
MacFawn I, Wilson H, Selth LA, Leighton I, Serebriiskii I, Bleackley RC, Elzanzamy O, Farris J, Pifer PM, Richer J, Frisch SM
"Grainyhead-like-2 confers NK-sensitivity through interactions with epigenetic modifiers". Mol Immunol. 2018 Nov 30;105:137-149. doi: 10.1016/j.molimm.2018.11.006. [Epub ahead of print]
PMID: 30508726

.....

Tanya Dilan, Graduate Student in Vishy Ramamurthy's Lab published her First Author Paper in the *Journal of Neuroscience*, entitled "ARL13B, a Joubert Syndrome-associated protein, is critical for retinogenesis and elaboration of mouse photoreceptor outer segments."

.....

Congratulations to **Urikhan Sanzhaeva**! Her work on imaging enzyme activity using EPR has been published in **Angewandte Chemie**, one of the top chemistry journals. Her work is entitled: "Imaging of Enzyme Activity by Electron Paramagnetic Resonance: Concept and Experiment Using a Paramagnetic Substrate of Alkaline Phosphatase"

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Upcoming Birthdays

V.M Rajendran	Dec	2
Aaron Robart	Dec	7
Andrey Bobko	Dec	11
David Fulaytar	Dec	14
Peter Stoilov	Dec	22
Jessica Allen	Dec	23
Jesse Sundar	Dec	24
Marieta Gencheva	Dec	27
Oxana Tseytlin	Dec	28
Brad Hillgartner	Dec	29
Rawaa Aljammal	Jan	8
Pete Mathers	Jan	11
Andrew Nickerson	Jan	16
Yuriy Loskutov	Jan	18
Marc Purazo	Jan	24
Tanya Dilan	Feb	1
Martin Poncelet	Feb	5
Helen Rodgers	Feb	6
Carol Sholtis	Feb	7
Siyan Zhu	Feb	10
Taylor Thomas	Feb	14
Alexey Ivanov	Feb	15
Scott Weed	Feb	20
Daniella Munezero	Feb	20
Paolo Fagone	Feb	24
Mason Colbert	Mar	3
Gregory Konat	Mar	6
Drew Shiemeke	Mar	6
Ian MacFawn	Mar	8
Evan Kerr	Mar	10
Urikhan Sanzhaeva	Mar	11
Jing Jie Yu	Mar	14
Karthikeyan Narayanan	Mar	19
Claire Smathers	Mar	22
Kidus Birhanu	Mar	25

"There is a close analogy between organic chemistry in its relation to biochemistry and pure mathematics in its relation to physics."

~ Robert Robinson

Kelli Phillips, Ph.D.

Laboratory Manager

WVU Graduate Advisor: Janet Cyr

Degree/Graduation Year: PhD 2006

Current Position/Title/Location:

Laboratory Manager, R&D Department at PPD in Richmond VA

What have you been up to since you left WVU? Career, family, other life events that you would like to share.

Since graduating from the Biochemistry Department at the WVU School of Medicine in 2006, I have worked as a research and development scientist at PPD; a Contract Research Organization (CRO; Pharmaceutical Industry).



Soon after graduation, I gave birth to my second son, Luke. He is now 9 years old and his brother Owen is 14.

More recently, in 2017, I completed my MBA at Virginia Commonwealth University.

What do you enjoy most about your current position, field of study, or your current life endeavors?

I entered the job market concurrently with the start of the Great Recession. This impacted the academic sector significantly leaving grants, post-doctoral positions Assistant Professor positions scarce. As a result, I looked for a position in the pharmaceutical industry and was hired by PPD. PPD provides a third-party assessment of the pharmacokinetics and immunogenicity of biologic therapeutics that are candidates for regulatory approval. Serendipitously, Herceptin, a breast cancer immunotherapy drug, had been on the market for only 8 years and the immunotherapy field

was rapidly expanding. As a result, I was able to grow my career along with a growing field. Currently I am a Laboratory Manager, managing a team of 14 scientists in a department of 57 scientists that are part of the PPD Richmond site, that employs close to 1000 scientists and support staff. I have the privilege of working with many pharmaceutical companies that are developing cutting edge therapies for many cancer indications and inflammatory diseases. I enjoy the knowledge that my project management, scientific oversight and client communication skills play a critical role in the development of life-saving therapeutics. I also enjoy the opportunity to travel when visiting client and attending industry meetings.

What advice would you give to current or incoming graduate students here at WVU?

I would emphasize the importance of expanding your scientific experience to as many laboratories as possible. While at times the scientific field may feel competitive, many researchers are open to collaborations and exposing ones self to as many ideas and mentors as possible makes for a well-rounded, well-connected, infinitely employable scientist.

How did your experience at WVU contribute to your professional career?

In addition to being an excellent scientist, my advisor, Dr. Janet Cyr, did a wonderful job helping me develop my career. Janet encouraged me to attend summer courses at Woods Hole, present posters at industry meetings and apply for the Ruth L. Kirschstein National Research Service Award



(NRSA). She consistently focused on quality science and impactful communications, and those core values impact my work daily.

What advice do you have for students getting ready to graduate during these difficult economic times?

HA!! You kids have it easy. 😊

It is my hope that recent global conversations are indicators that scientific knowledge will become increasing respected across industries. Even so, expose yourself to as many skills as possible and network often. New graduates should understand that entry level jobs (even for PhDs) may not be glamorous, but good scientists are valuable and career progression is often only limited by enthusiasm and motivation.



[Recent Publications]

- MacFawn I, Wilson H, Selth LA, Leighton I, Serebriiskii I, Bleackley RC, Elzamzamy O, Farris J, Pifer PM, Richer J, **Frisch SM** "Grainyhead-like-2 confers NK-sensitivity through interactions with epigenetic modifiers." Mol Immunol. 2018 Nov 30;105:137-149. doi: 10.1016/j.molimm.2018.11.006. [Epub ahead of print] PMID: 30508726
- Bapat A, Keita N, Martelly W, Kang P, Seet C, Jacobsen JR, **Stoilov P**, Hu C, Crooks GM, Sharma S. "Myeloid Disease Mutations of Splicing Factor SRSF2 Cause G2-M Arrest and Skewed Differentiation of Human Hematopoietic Stem and Progenitor Cells." Stem Cells. 2018 Nov;36(11):1663-1675. doi: 10.1002/stem.2885. Epub 2018 Jul 27. PMID: 30004607 Free PMC Article
- Bhardwaj R, Dod H, Sandhu MS, Bedi R, Dod S, **Konat G**, Chopra HK, Sharma R, Jain AC, Nanda N. "Acute effects of diets rich in almonds and walnuts on endothelial function." Indian Heart J. 2018 Jul - Aug;70(4):497-501. doi: 10.1016/j.ihj.2018.01.030. Epub 2018 Feb 1. PMID: 30170643
- Brandebura AN, Morehead M, Heller DT, Holcomb P, Kolson DR, Jones G, **Mathers PH**, Spirou GA. "Glial Cell Expansion Coincides with Neural Circuit Formation in the Developing Auditory Brainstem." Dev Neurobiol. 2018 Nov;78(11):1097-1116. doi: 10.1002/dneu.22633. Epub 2018 Aug 26. PMID: 30136399
- Brooks C, Murphy J, Belcastro M, Heller, D, **Kolandaivelu S, Sokolov M** (2018). "Farnesylation of the transducin G protein gamma subunit is a prerequisite for its ciliary targeting in rod photoreceptors." Front Mol Neurosci, 11:16. PMCID: PMC5787109
- Brooks C, Snoberger A, Belcastro M, Murphy J, Kisselev OG, **Smith DM, Sokolov M**. "Archaeal Unfoldase Counteracts Protein Misfolding Retinopathy in Mice." The Journal of neuroscience : the official journal of the Society for Neuroscience. 2018; 38(33):7248-7254. PubMed [journal] PMID: 30012684 PMCID: PMC6096037
- Chan RT, Peters JK, **Robart AR**, Wiryaman T, Rajashankar KR, Toor N. "Structural basis for the second step of group II intron splicing." Nat Commun. 2018 Nov 8;9(1):4676. doi: 10.1038/s41467-018-06678-0. PMID: 30410046
- Dower CM, Wills CA, **Frisch SM**, Wang HG. "Mechanisms and context underlying the role of autophagy in cancer metastasis." Autophagy. 2018;14(7):1110-1128. doi: 10.1080/15548627.2018.1450020. Epub 2018 Jun 4. PMID: 29863947
- Gorodetskii AA, Eubank TD, Driesschaert B, Poncelet M, Ellis E, **Khramtsov VV, Bobko AA**. "Oxygen-induced leakage of spin polarization in Overhauser-enhanced magnetic resonance imaging: Application for oximetry in tumors." J Magn Reson. 2018 Dec;297:42-50. doi: 10.1016/j.jmr.2018.10.005. Epub 2018 Oct 10. PMID: 30359906
- Komarov DA, Ichikawa Y, Yamamoto K, Stewart NJ, Matsumoto S, Yasui H, Kirilyuk IA, **Khramtsov VV**, Inanami O, Hirata H. "In Vivo Extracellular pH Mapping of Tumors Using Electron Paramagnetic Resonance." Anal Chem. 2018 Nov 8. doi: 10.1021/acs.analchem.8b03328. [Epub ahead of print] PMID: 30372035
- MacFawn I, Wilson H, Selth LA, Leighton I, Serebriiskii I, Bleackley RC, Elzamzamy O, Farris J, Pifer PM, Richer J, **Frisch SM**. "Grainyhead-like-2 confers NK-sensitivity through interactions with epigenetic modifiers." Mol Immunol. 2018 Nov 30;105:137-149. doi: 10.1016/j.molimm.2018.11.006. [Epub ahead of print] PMID: 30508726
- Qin Z, **Stoilov P**, Zhang X, Xing Y. "SEASTAR: systematic evaluation of alternative transcription start sites in RNA." Nucleic Acids Res. 2018 May 4;46(8):e45. doi: 10.1093/nar/gky053. PMID: 29546410
- Rodgers HM, Huffman VJ, Voronina VA, Lewandoski M, **Mathers PH**. "The role of the Rx homeobox gene in retinal progenitor proliferation and cell fate specification." Mech Dev. 2018 Jun;151:18-29. doi: 10.1016/j.mod.2018.04.003. Epub 2018 Apr 14. PMID: 29665410
- Sanzhaeva U, Xu X, Guggilapu P, **Tseytlin M, Khramtsov VV**, Driesschaert B. "Imaging of Enzyme Activity by Electron Paramagnetic Resonance: Concept and Experiment Using a Paramagnetic Substrate of Alkaline Phosphatase." Angew Chem Int Ed Engl. 2018 Sep 3;57(36):11701-11705. doi: 10.1002/anie.201806851. Epub 2018 Aug 7. PMID: 30004607

"We are at our very best, and we are happiest, when we are fully engaged in work we enjoy on the journey toward the goal we've established for ourselves. It gives meaning to our time off and comfort to our sleep. It makes everything else in life so wonderful, so worthwhile."
~ Earl Nightingale

[CTSI- IRB Approved study]

CTSI WVU purchased a clinical EPR system in 2017 that will be used for oxygen measurements in tissues and tumors.

Drs. Tseytlin, Bobko, Khramtsov, and Oxana Tseytlin from the Biochemistry Department provide EPR expertise. A first IRB approved study is currently being conducted with participation of 20 healthy volunteers.

The goals of this study are to gain skills in using the EPR spectrometer in clinical settings and evaluate reproducibility and performance of oxygen-sensitive EPR probes that are used in the studies.

The probes imbedded in the FDA-approved oxygen-permeable polymer were locally synthesized by Dr. Bobko with the help of Oxana Tseytlin. Thin disks of this material were made that when applied to the skin measure subcutaneous oxygen partial pressure, which gradually reduces from that in the atmosphere to a steady-state value.

Evaluation of the time required to achieve the equilibrium point will be also an important result of the conducted study. Upon completion of the current experiments (planned for January 2019) and evolution of the spectrometer and oxygen sensitive probes, a group of WVU researchers, interested in the technology will use the instrument.

One of the future direction will be cancer-related studies. A working group of several WVU scientists and medical doctors was formed under the leadership of Dr. Sally Hodder (CTSI director). This group plans and coordinates clinical EPR research at WVU.



[Japanese Scientists from Hokkaido University Visit the IMMR]

International Collaborative Meeting with the In vivo Multifunctional Magnetic Resonance center

December 5-7, 2018. A group of Japanese scientists, Prof. H. Hirata from Hokkaido University (Sapporo), and Prof. Kazuhiro Ichikawa and his colleague, Assistant Prof. Ayano Enomoto, from Nagasaki International University, visited the IMMR center at the HSC to explore opportunities for collaborative research in the field of cancer imaging. The visit was supported by the Japan Society for Promotion of Sciences (JSPS). Prof. H. Hirata is a leader of the internationally recognized electron paramagnetic resonance (EPR) imaging group focused on oxygen and pH (acidosis) mapping in cancer, and is a long-time collaborator of the Director of the In vivo Multifunctional Magnetic Resonance (IMMR) center, Dr. Valery Khramtsov. Prof. Kazuhiro, a leader in the development of a spe-

cialized MRI approach, is establishing a new laboratory focused on in vivo applications with a particular interest to functional tumor mapping. The Japanese scientists presented their recent research at the IMMR center Seminar followed by intensive discussions with the PIs of the IMMR center, sharing their views and opportunities for further collaborations. The investigators were able to identify several mutually-beneficial subjects for collaborations with immediate implications, including pilot experiments and instrumental developments at both WVU and Japan. The visit facilitated further progress in already ongoing collaboration between the IMMR center and Japanese laboratories and will benefit all collaborative sites.

The IMMR center in the Health Sciences Center (<https://www.hsc.wvu.edu/immr/>) applies state-of-the-art magnetic resonance approaches to biomedicine with

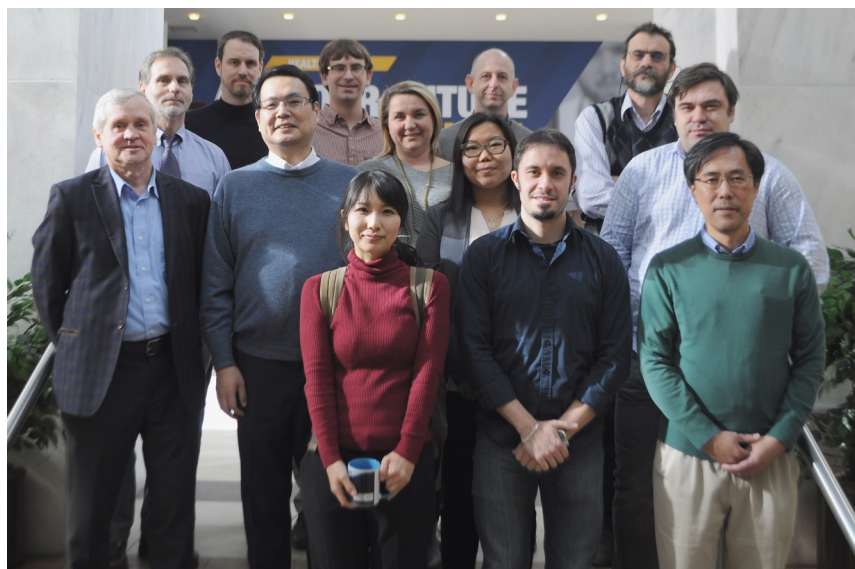
a focus on cancer research. These approaches, MRI, EPR or a combination of these two technologies, proton-electron double-resonance imaging (PEDRI) are used in combination with contrast agents or specific particulate or soluble compounds to monitor physiologically-relevant parameters of the tumor micro-environment (TME), including oxygenation, acidity, redox state, interstitial inorganic phosphate, and glutathione, longitudinally and in real-time, in vivo. These tools provide unique insights into the role of the TME in cancer aggression, metastatic activity, and treatment efficacy, and creates novel opportunity for designing TME-targeted anticancer therapies. Dr. Valery Khramtsov, Prof. of Biochemistry, is a Principal Investigator (PI) on a National Cancer Institute (NCI)-funded R01 project (\$1,370,404) that develops the innovative magnetic resonance approaches for multifunctional in vivo TME profiling in a

[Japanese Scientists from Hokkaido University Visit the IMMR cont'd]

mouse model of breast cancer. Dr. Timothy Eubank, Associate Prof. of Microbiology, Immunology, and Cell Biology, is a Co-PI together with Dr. Khramtsov on another (NCI)-funded R01 project (\$1,388,737) that applies these approaches to investigate a role of macrophages in response to hypoxia to TME regulation, cancer pro-

gression and therapy efficacy. Drs. Raymond Raylman, Prof. of Radiology, and Mark Tseytlin, Assistant Prof. of Biochemistry, are Co-PIs on a new National Institute of Biomedical Imaging and Bioengineering (NIBIB)-funded R01 (\$2,718,038) that aims to integrate a PET scanner with an EPR imager to complement metabolic

information such as glucose uptake measured by PET with TME profiling (measured by EPR imaging). Dr. Benoit Driesschaert, Research Assistant Prof. of Pharmaceutical Sciences, is a PI on NIBIB-funded project (\$901,755) to develop new biocompatible contrast agents for pre-clinical application to cancer, and Dr. Andrey Bobko, Research Assistant Prof. of Biochemistry, is a Project Leader on National Institutes of General Medical Sciences (NIGMS)-funded project (\$750,000) to develop theranostic contrast agents that combine diagnostic and therapeutic capabilities. The PIs at the IMMR center possess backgrounds in various fields from basic sciences such as chemistry, physics and engineering, to preclinical- and clinical research, and tightly collaborate with each other, with other investigators at WVU, and at other national and international institutions. In 2017, the IMMR center (with support from WVU Health Sciences Center, Department of Biochemistry, and NIOSH) hosted an international conference on in vivo EPR that attracted over 120 scientists from 12 countries (<https://www.hsc.wvu.edu/epr2017/>).



IMMRc and Japanese scientists: *Front Row:* Ayano Enomoto, Martin Poncet and Hiroshi Hirata. *Middle Row:* Valery Khramtsov, Kazuhiro Ichikawa, Urikhan Sanzhaeva, Andrey Bobko. *Back Row:* Raymond Raylman, Tim Eubank, Stephen DeVience, Oxana Tseytlin, Benoit Driesschaert, Mark Tseytlin.

[StellenCoA 2018: SASBMB Focused Meeting]

StellenCoA 2018: SASBMB Focused Meeting on Coenzyme A in Health, Disease and Bioscience

CoA) are centrally important to energy metabolism, fatty acid metabolism, and as second messenger. As such, CoA has a wide-ranging impact on health and disease, with a proven role in a diversity of conditions and processes including aging, cancer, diabetes, neurological function and mitochondrial function. The biosynthesis and utilization of CoA has also been highlighted as a target for antimicrobial development.

The proposed Focused Meeting will follow on only two previous meetings held on CoA, and provides the only forum where academic and industrial researchers from these diverse fields can meet to exchange ideas and challenge the frameworks of our current understanding of the role of CoA and its derivatives in all aspects of health,

disease and bioscience.

Roberta Leonardi, Ph.D., was an invited speaker and two of her Graduate Students, Evan Kerr and Stephanie Shumar, were awarded full and partial fellowships respectively, and attended the conference along with Roberta.



28 October 2018 - 1 November 2018
Stellenbosch, South Africa

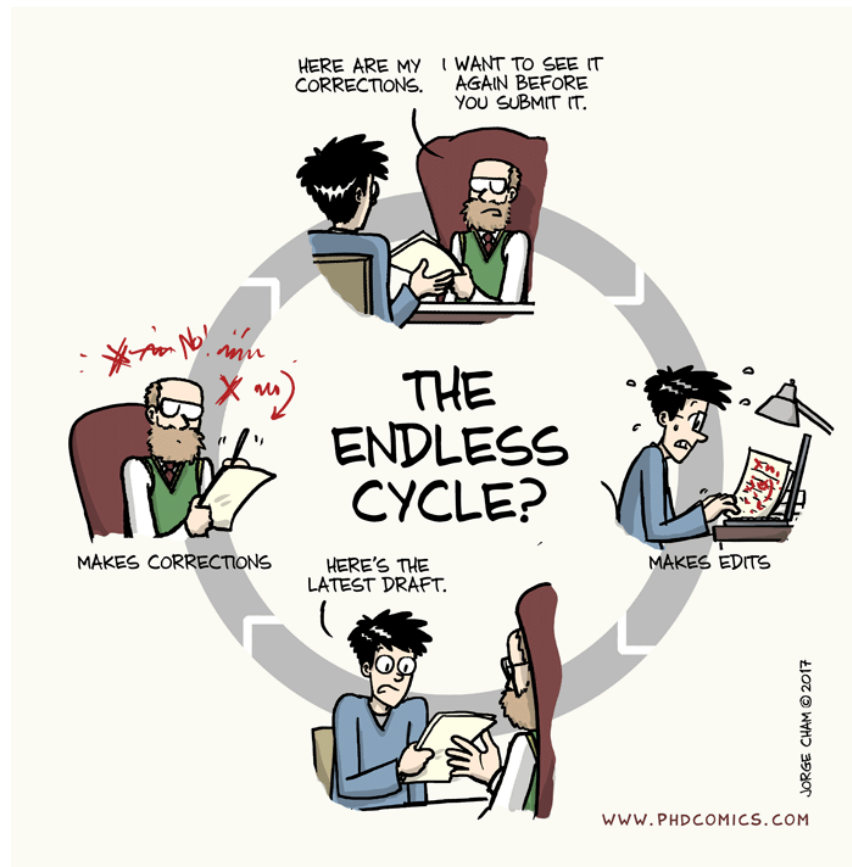
Coenzyme A (CoA) and its various derivative forms (mostly importantly, acetyl-



[Recent Publications Cont'd]

30003653

- Sarkar P, Saha T, Sheikh IA, Chakraborty S, Aoun J, Chakrabarti MK, **Rajendran VM**, Ameen NA, Dutta S, Hoque KM. "Zinc Ameliorates Intestinal Barrier Dysfunctions in Shigellosis by Reinstating Claudin-2 and -4 on the Membranes." Am J Physiol Gastrointest Liver Physiol. 2018 Nov 8. doi: 10.1152/ajpgi.00092.2018. [Epub ahead of print] PMID: 30406698
- Sinha T, Makia M, **Du J**, Naash MI, Al-Ubaidi MR. "Flavin homeostasis in the mouse retina during aging and degeneration." J Nutr Biochem. 2018 Sep 15;62:123-133. doi: 10.1016/j.jnutbio.2018.09.003. [Epub ahead of print] PMID: 30290331
- **Smith DM**. "Could a Common Mechanism of Protein Degradation Impairment Underlie Many Neurodegenerative Diseases?" Journal of experimental neuroscience. 2018; 12:1179069518794675. PubMed [journal]PMID: 30147359 PMCID: PMC6102758
- Snoberger A, Brettrager EJ, **Smith DM**. "Conformational switching in the coiled-coil domains of a proteasomal ATPase regulates substrate processing." Nature communications. 2018; 9(1):2374. PubMed [journal]PMID: 29915197 PMCID: PMC6006169
- Wright ZC, Loskutov Y, Murphy D, **Stoilov P**, **Pugacheva E**, Goldberg AFX, **Ramamurthy V**. "ADP-Ribosylation Factor-Like 2 (ARL2) regulates cilia stability and development of outer segments in rod photoreceptor neurons." Sci Rep. 2018 Nov 16;8(1):16967. doi: 10.1038/s41598-018-35395-3. PMID: 30446707
- Zhao H, Martin E, Matalkah F, Shah N, Ivanov A, **Ruppert JM**, Lockman PR, **Agazie YM**. "Conditional knockout of SHP2 in ErbB2 transgenic mice or inhibition in HER2-amplified breast cancer cell lines blocks oncogene expression and tumorigenesis." Oncogene. 2018 Nov 22. doi: 10.1038/s41388-018-0574-8. [Epub ahead of print] PMID: 30467378



"The grand aim of all science is to cover the greatest number of empirical facts by logical deduction from the smallest number of hypotheses or axioms."
~ Albert Einstein

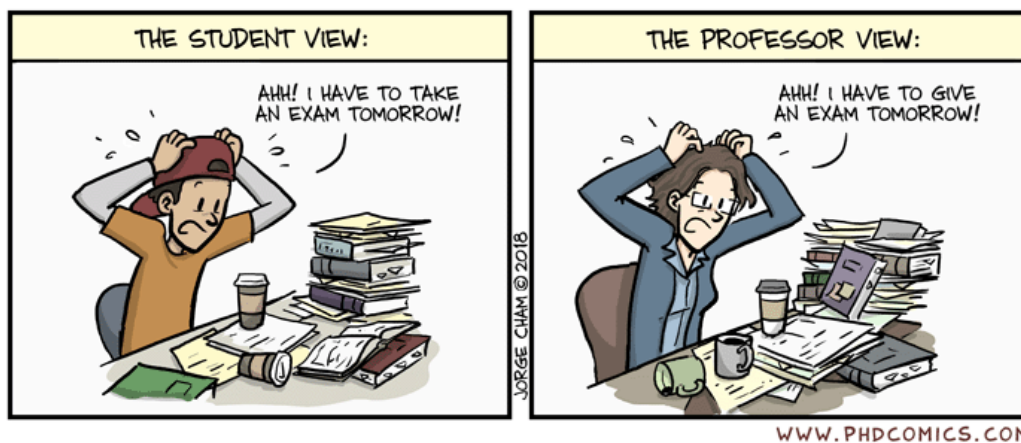
3		2				1		
			5	3		7		
6	7		9					
			2		5		8	9
	4						7	
5	1		4		7			
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[Coffee Break]

Daily Sudoku: Fri 1-Feb-2019

medium



Microbiology

S	A	T	I	C	U	L	L	C	T	S	Y	R	C
E	E	N	T	E	R	O	C	O	C	C	U	S	I
I	O	B	A	G	O	A	C	O	C	O	A	C	A
N	L	A	C	T	O	B	A	C	I	L	L	U	S
O	F	C	M	U	I	D	I	R	T	S	O	L	C
L	U	O	T	F	L	A	O	Y	M	L	E	O	S
O	N	M	O	D	O	S	S	O	R	L	S	A	S
C	G	E	U	D	O	C	C	I	S	M	I	C	A
I	I	L	C	L	Y	S	E	C	A	C	L	C	I
C	O	R	Y	N	E	B	A	C	T	E	R	I	A
S	E	O	C	T	A	C	L	Y	M	T	N	N	A
N	I	O	U	M	S	M	E	C	L	S	R	O	U
O	R	L	I	C	T	O	D	G	E	T	E	R	T
O	T	O	M	D	L	M	O	O	N	E	I	E	N

CORYNEBACTERIA

CLOSTRIDIUM

LACTOBACILLUS

ENTEROCOCCUS

COLONIES

MRSA

YEAST

FUNGI

[Crossword Puzzle]

DAILY AMERICAN Crossword

Daily Crossword : November 14

Michael Curl

Puzzle Content © Michael Curl

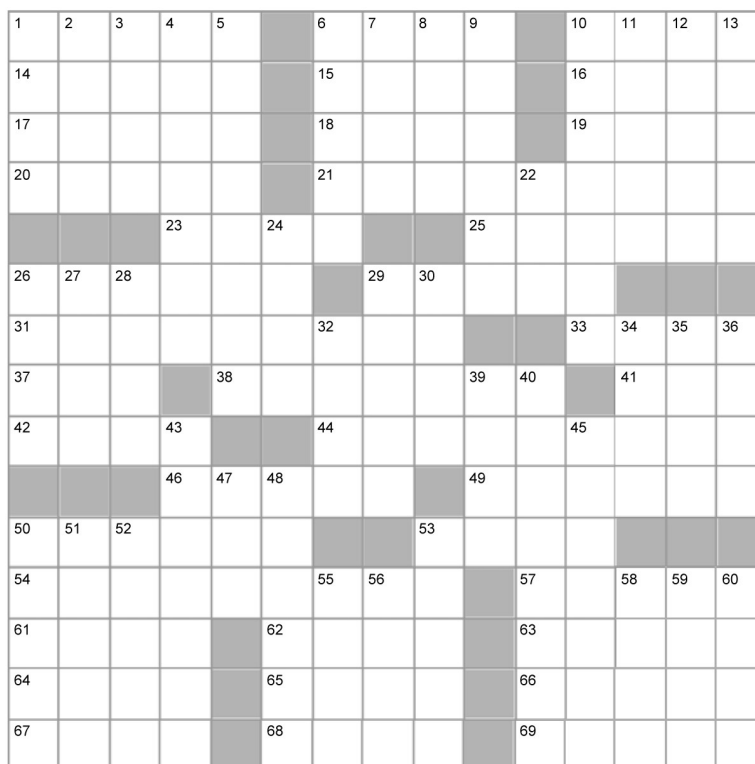
A free daily crossword puzzle, American-style,
that's not too hard and not too easy.

ACROSS

- 1 Early jazz composition
- 6 Love, to Lucretius
- 10 Medallion meat
- 14 Gambling game
- 15 Lavish affection
- 16 Baltic port
- 17 Acquiesce
- 18 Podium
- 19 Norse king
- 20 Defensive ditches
- 21 Stiff-necked
- 23 High spd. phone line
- 25 Irish province
- 26 Means of access
- 29 Mattress filling
- 31 Fashionable area of London
- 33 Weapon in a silo, for short
- 37 "___ My Party"
- 38 Samuel Butler's Utopia
- 41 William Tell's home
- 42 Wart-covered creature
- 44 Tear to pieces
- 46 Indian princes
- 49 Narcotic
- 50 Pick
- 53 Benefit
- 54 North German citizen
- 57 Sum
- 61 Kazakh-Uzbek sea
- 62 Curly-leafed cabbage
- 63 Persian, today
- 64 Air
- 65 Jane Austen heroine
- 66 Treat with tea
- 67 Irritated state
- 68 Escritoire
- 69 James or Marsha

DOWN

- 1 Unwanted e-mail
- 2 Ghana's neighbor
- 3 Gumbo ingredient
- 4 Encounter
- 5 Coerce



- 6 Extension
- 7 Biblical kingdom
- 8 Elevator inventor
- 9 Gather one's strength
- 10 Anna Karenina's lover
- 11 Israeli seaport
- 12 Playing marble
- 13 Tennis great Rod
- 22 Specialized U.N. agency
- 24 Costly
- 26 Somewhat
- 27 Quash
- 28 Film feline
- 29 NZ birds
- 30 Sounds of satisfaction
- 32 Hindu scripture
- 34 Castro's land
- 35 Author Harte
- 36 Deep mud
- 39 Melville title
- 40 It's relatively helpful
- 43 Small amount
- 45 One of the Balearics
- 47 Prefix with pressure
- 48 Pulled suddenly
- 50 Powwows
- 51 ___ al-Rashid
- 52 Muscat native
- 53 Fracture
- 55 Plucky
- 56 Shade trees

- 58 Kit Carson's home
- 59 The A in A.D.
- 60 Property claim

Crossword Puzzle answers located on the back page [No  KING...]

[Coffee Break]

[Upcoming Events]

WVU and Morgantown Upcoming Events ()

1/10/2019	Spring 2019 BIOC 797 Research Forum	4:00 PM	Lab Name Dr. McLaughlin; Jake Hoover
1/15/2019	Faculty Meeting	Noon	Wirtz Library
1/12/2019	WVU Men's Basketball vs Oklahoma State	Noon	WVU Coliseum
1/11-13/2019	Paw Patrol Live	Various Times	PPG Paints Arena - Pittsburgh, PA
1/17/2019	Spring 2019 BIOC 797 Research Forum	4:00 PM	Lab Name Dr. Ruppert
1/19/2019	WVU Men's Basketball vs Kansas	2 PM	WVU Coliseum
1/21/2019	Martin Luther King - WVU Closed		
1/21/2019	WVU Men's Basketball vs Baylor	9:00 PM	WVU Coliseum
1/26/2019	Annual Chili Cook-Off	Noon	Triple S Harley-Davidson; Westover, WV
1/24-27/2019	WTAE Winterfest at Steven Springs Resort, PA	All Day	Champion, PA
1/31/2019	Spring 2019 BIOC 797 Research Forum	4:00 PM	Lab Name Dr. Leonardi; Evan Kerr
2/2/2019	WVU Men's Basketball vs Oklahoma	Noon	WVU Coliseum
2/8-10/2019	Monster Jam	Various Times	PPG Paints Arena - Pittsburgh, PA
2/9/2019	WVU Men's Basketball vs Texas	8:00 PM	WVU Coliseum
2/13/2019	WVU Career & Internship Fair	10 AM - 3 PM	WVU Mountainlair Ballrooms
2/14/2019	Spring 2019 BIOC 797 Research Forum	4:00 PM	Lab Name Dr. Khrantsov; Martin Poncelet
2/12/2019	Faculty Meeting	Noon	Wirtz Library
2/18/2019	WVU Men's Basketball vs Kansas State	9:00 PM	WVU Coliseum
2/19/2019	Dr. Daniel Kraut from Villanova University	Noon	WVU Eye Institute Auditorium Rm E225
2/23/2019	Empty Bowls Luncheon	TBD	Mylan Park, Morgantown, WV
2/26/2019	WVU Men's Basketball vs TCU	7:00 PM	WVU Coliseum
2/28/2018	Spring 2019 BIOC 797 Research Forum	4:00 PM	Lab Name Dr. Robart; Claire Smathers
3/5/2019	Dr. Kouichi Nakagawa from Hirosaki University	Noon	WVU Eye Institute Auditorium Rm E225
3/6/2019	WVU Men's Basketball vs Iowa State	7:00 PM	WVU Coliseum
3/9-16/2019	WVU Spring Break		
3/12/2019	Faculty Meeting (Spring Break Week)	Noon	Wirtz Library
3/13-16/2019	BIG 12 Championship Basketball	TBA	Kansas City, MO
3/19/2019	Dr. Paul Park from Case Western University	Noon	WVU Eye Institute Auditorium Rm E225
3/21/2019	Spring 2019 BIOC 797 Research Forum	4:00 PM	Lab Name Dr. Ramamurthy; Jesse Sunder
3/21-22/2019	54th Van Liere Research Conference	All Day	WVU Health Sciences
3/26/2019	Dr. James Hurley from University of Washington	Noon	WVU Eye Institute Auditorium Rm E225

3	9	2	8	7	4	1	6	5
4	8	1	5	3	6	7	9	2
6	7	5	9	2	1	8	4	3
7	6	3	2	1	5	4	8	9
2	4	9	3	6	8	5	7	1
5	1	8	4	9	7	3	2	6
9	5	7	6	4	3	2	1	8
1	3	6	7	8	2	9	5	4
8	2	4	1	5	9	6	3	7

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1	S	2	T	3	O	4	M	5	P	6	A	7	M	8	O	9	R	10	V	11	E	12	A	13	L
14	P	15	O	16	K	17	E	18	R	19	D	20	O	21	T	22	E	23	R	24	I	25	G	26	A
27	A	28	G	29	R	30	E	31	E	32	D	33	A	34	I	35	S	36	O	37	L	38	A	39	V
40	M	41	O	42	A	43	T	44	S	45	O	46	B	47	S	48	T	49	N	50	A	51	T	52	E
53		54		55	I	56	S	57	D	58	N	59		60	U	61	L	62	S	63	T	64	E	65	R
66	A	67	V	68	E	69	N	70	U	71	E	72	K	73	A	74	P	75	O	76	K	77		78	
79	B	80	E	81	L	82	G	83	R	84	A	85	V	86	I	87	A	88	I	89	C	90	B	91	M
92	I	93	T	94	S	95		96	E	97	R	98	E	99	W	100	H	101	O	102	N	103	U	104	R
105	T	106	O	107	A	108	D	109		110	D	111	I	112	S	113	M	114	E	115	M	116	B	117	E
118		119		120	R	121	A	122	J	123	A	124	S	125		126	O	127	P	128	I	129	A	130	T
131	C	132	H	133	O	134	I	135	C	136	E	137		138	B	139	O	140	O	141	N	142		143	
144	H	145	A	146	M	147	B	148	U	149	R	150	G	151	E	152	R	153		154	T	155	O	156	A
157	A	158	R	159	A	160	L	161		162	K	163	A	164	L	165	E	166		167	I	168	R	169	A
170	T	171	U	172	N	173	E	174		175	E	176	M	177	M	178	A	179		180	S	181	C	182	O
183	S	184	N	185	I	186	T	187		188	D	189	E	190	S	191	K	192		193	M	194	A	195	S

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