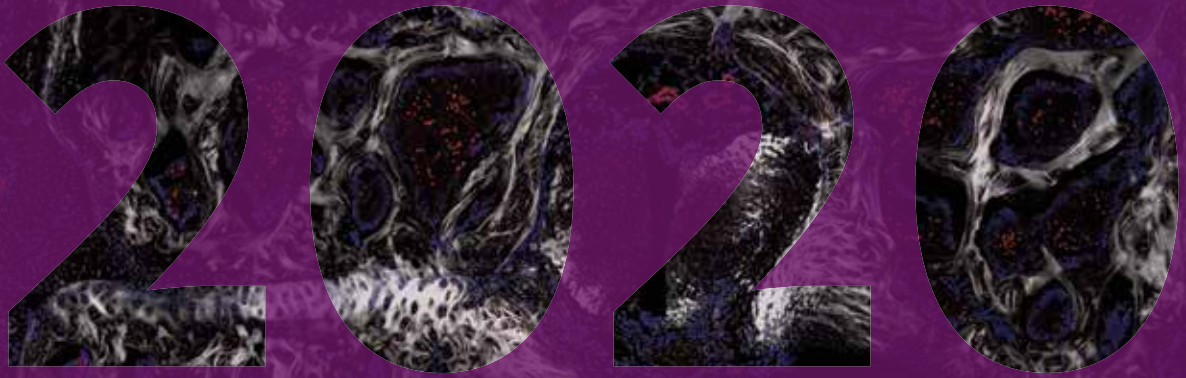
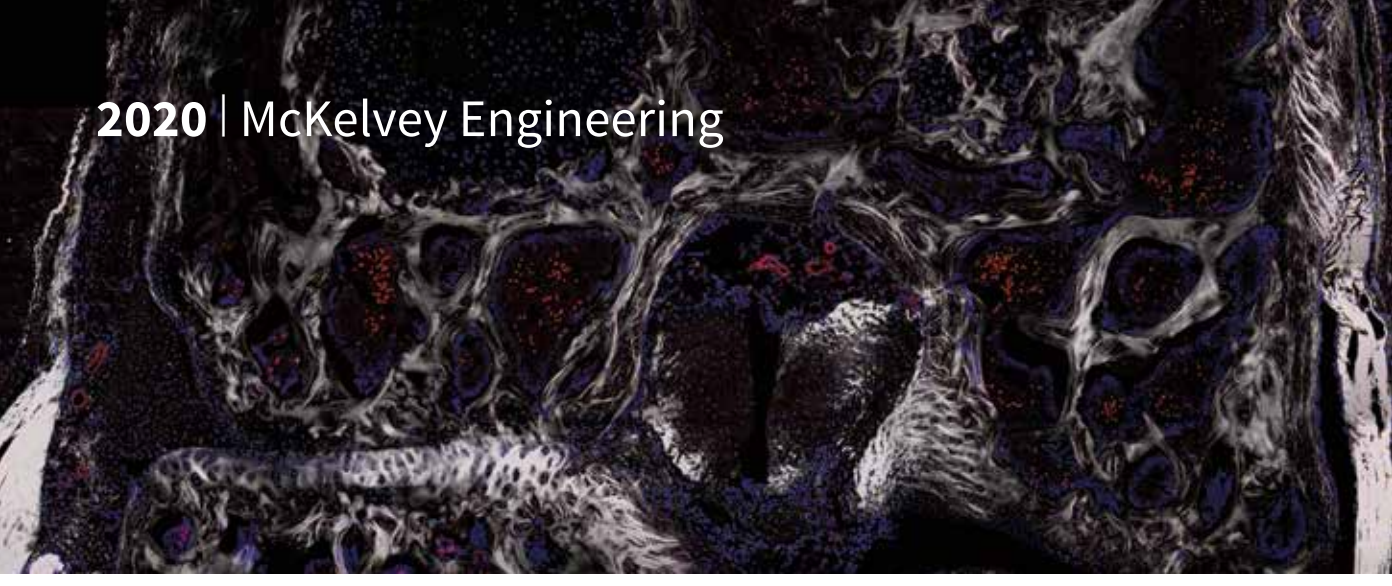


Washington University in St. Louis

McKelvey Engineering



2020 | McKelvey Engineering

January 13
First day of classes

February 16-22
National Engineers Week

March 8-14
Spring Break

April 17-19
Reunion at Thurtene Carnival

April 23
McKelvey Engineering Awards

April 24
Last day of classes

May 14-16
Reunion at Commencement

May 15
Commencement

August 24
First day of classes

October 10-13
Fall Break

December 4
Last day of classes

December 12
December Commencement

2020 | at a glance

January

S	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

February

S	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

March

S	M	Tu	W	Th	F	Sa
1	2	3	4	5	6	7
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15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

April

S	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

May

S	M	Tu	W	Th	F	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24/31	24	26	27	28	29	30

June

S	M	Tu	W	Th	F	Sa
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7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

July

S	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

August

S	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23/30	24/31	25	26	27	28	29

September

S	M	Tu	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

October

S	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
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18	19	20	21	22	23	24
25	26	27	28	29	30	31

November

S	M	Tu	W	Th	F	Sa
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8	9	10	11	12	13	14
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22	23	24	25	26	27	28
29	30					

December

S	M	Tu	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

January

S	M	Tu	W	Th	F	Sa
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1

Shubham Agrawal

Doctoral candidate in the Department of Energy, Environmental & Chemical Engineering

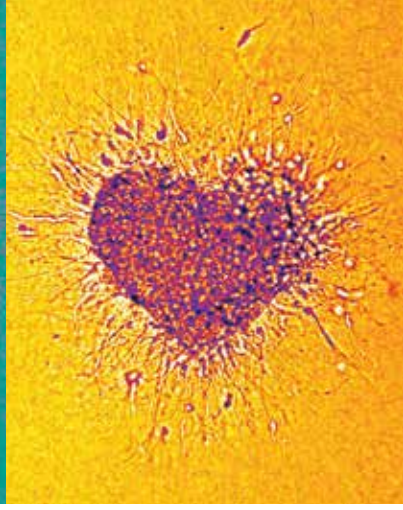
The colorful image is the graphite anode during lithium ion intercalation observed through optical microscope. Graphite is a unique material that changes colors according to the amount of lithium ions filled in it. The vibrant colors indicate a heterogeneous distribution of charge under a constant flux. The current analysis opens a new paradigm in a better design of electrodes.

The Battery Analytical Investigation (BAI) Group focuses on precision electrochemical engineering. The group is working toward an intricate understanding of alkali ion intercalation and alkali metal electrodeposition mechanisms. In addition, the group is motivated to develop "smart" separators to prevent dendrite growth in alkali metal batteries.

Agrawal is a member of Assistant Professor Peng Bai's lab.

» **bailab.wustl.edu**

February



S	M	Tu	W	Th	F	Sa
26	27	28	29	30	31	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

Yingye (Cheri) Fang

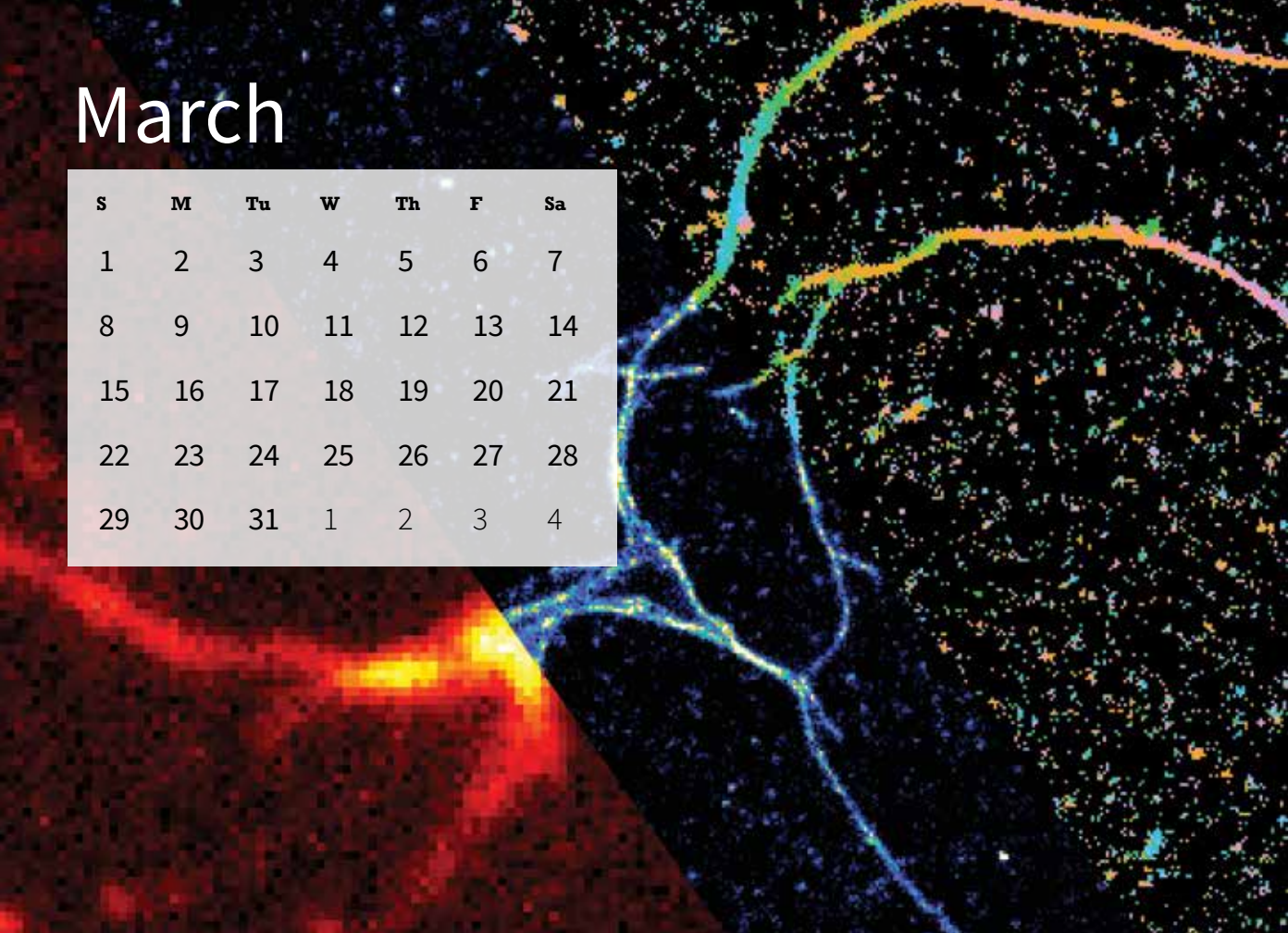
Doctoral candidate in the Department of Biomedical Engineering

Tumor is clingy and science is romantic. This image shows a glioblastoma spheroid invading within the collagen matrix.

One of Fang's research interests is to investigate quantitative correlations between cancer aggressiveness and concentrations of cancer biomarker proteins at single-cell level. The quantitative data are extremely useful not only for a better proteomic understanding of cancer progression, but also for parametrizing computational models that predict outcomes of anti-cancer therapy.

Fang is a member of Associate Professor Princess Imoukhuede's lab.

» **imoukhuedelab.wustl.edu**



March

S	M	Tu	W	Th	F	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4

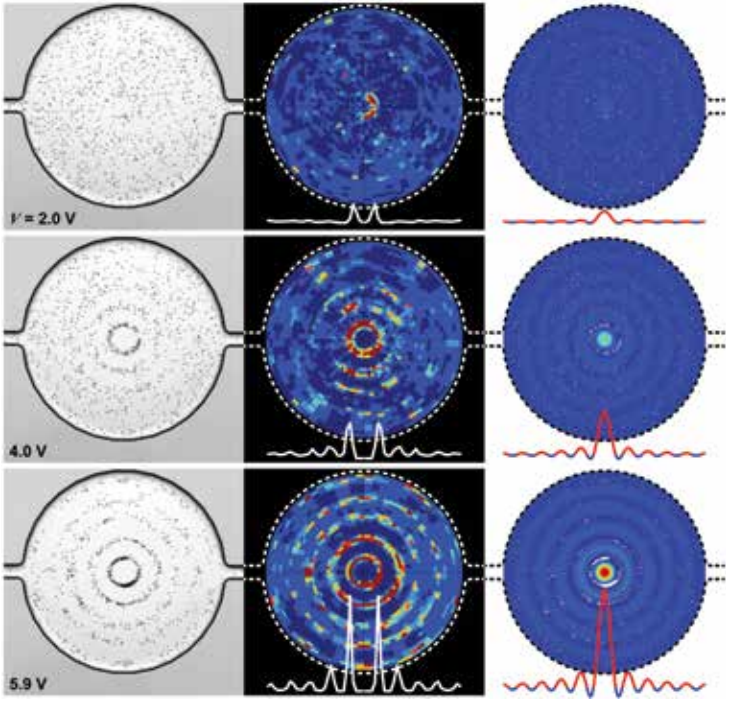
Matthew Lew

Assistant Professor in the Department of Electrical & Systems Engineering

The composite image shows an interconnected network of amyloid beta fibers, crucially involved in Alzheimer's disease, collected using Transient Amyloid Binding (TAB) super-resolution microscopy developed by the Lew Lab. The left side shows an image from a standard fluorescence microscope, while the middle shows the improved resolution achievable by TAB imaging. The right side shows a new variant of TAB imaging: the orientation of each fluorescent molecule is color-coded to reveal the organization of beta sheets within the fiber network.

The Lew Lab leverages innovations in applied physics, electrical engineering, computational algorithms and chemistry to create optical imaging systems that enable us to see activities in the molecular world that could never be seen before.

» **lewlab.wustl.edu**



April

S	M	Tu	W	Th	F	Sa
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	1	2

Minji Kim

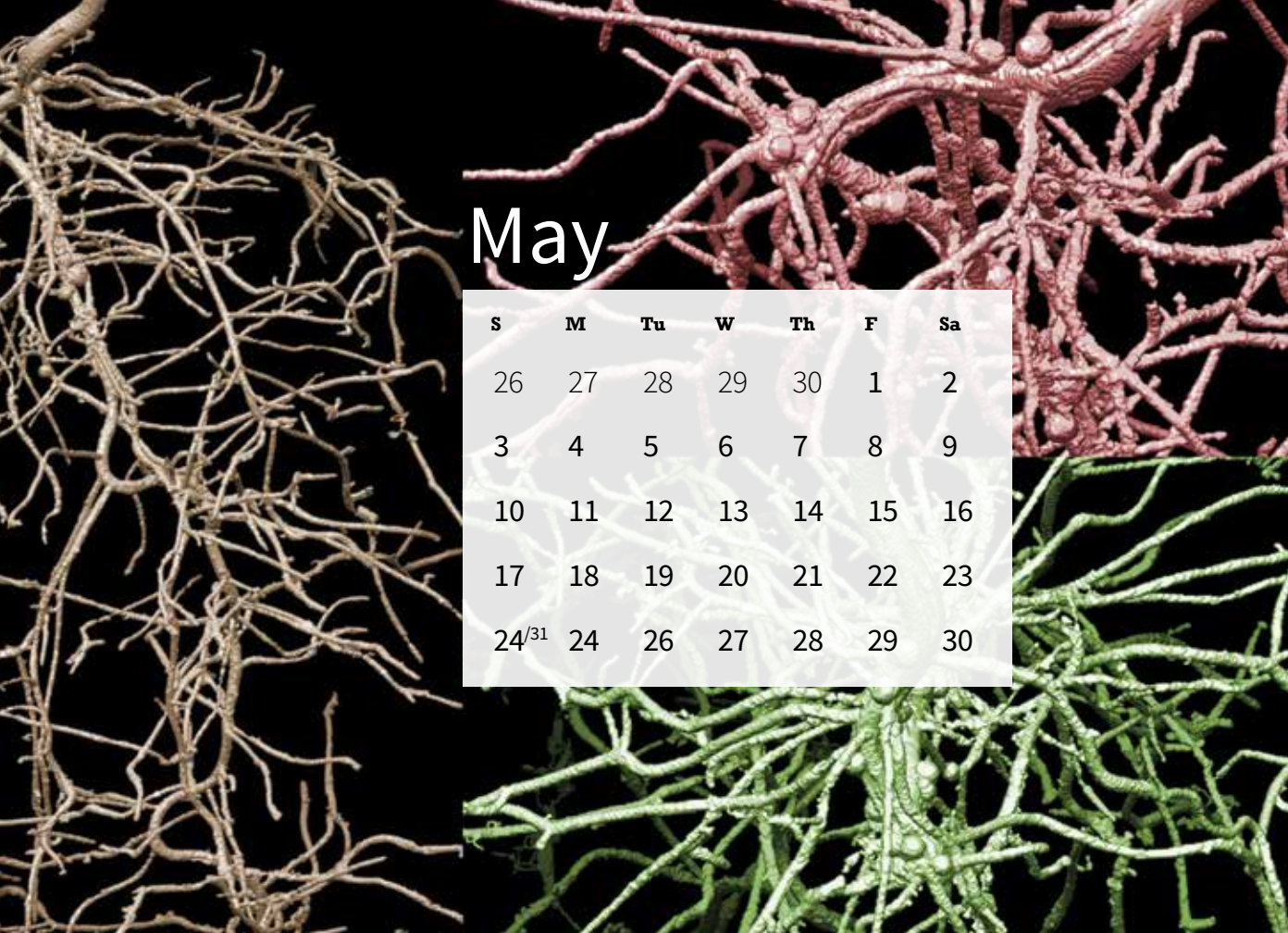
Doctoral candidate in the Department of Mechanical Engineering & Materials Science

The images (left) show cells swimming in the ultrasonic standing wave field of an acoustofluidic device as the drive amplitude is increased from a near-threshold value until cells are confined throughout the circular microfluidic chamber. Heat maps (middle) and contour plots (right) reflect cell distribution density and an analytical description of the field, respectively.

Acoustofluidic devices use ultrasound to provide a gentle, purely physical means of microscale object manipulation. Swimming cells dynamically respond to the imposed force field within such devices. The lab exploits this behavior to use *Chlamydomonas reinhardtii* as living probes to measure these fields.

Kim is a member of Assistant Professor Mark Meacham's lab.

» **meachamlab.wustl.edu**



May

S	M	Tu	W	Th	F	Sa
26	27	28	29	30	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24/31	24	26	27	28	29	30

Ayan Chakrabarti

Assistant Professor in the Department of Computer Science & Engineering

Tao Ju

Professor in the Department of Computer Science & Engineering

The images are visualizations of the three-dimensional root structure of a plant which researchers have extracted computationally from noisy X-ray CT scans.

Ayan Chakrabarti and Tao Ju are using their expertise in machine-learning tools and computer vision as part of a four-year, $3 million project with R. Keith Slotkin, Chris Topp and others at the Donald Danforth Plant Science Center (DDPSC). The ultimate goal is to have a predictive model where they can provide an idea of how changes in the environment will change the genetic configuration of a plant.

» **vlg.seas.wustl.edu**

June

S	M	Tu	W	Th	F	Sa
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	1	2	3	4

Ian Berke

Doctoral candidate in the Department of Biomedical Engineering

The image shows adult neural crest-derived neurons that were visualized in the mid-contact region of the murine joint. Neural innervation can be observed in various joint tissues including synovium, ligament and bone.

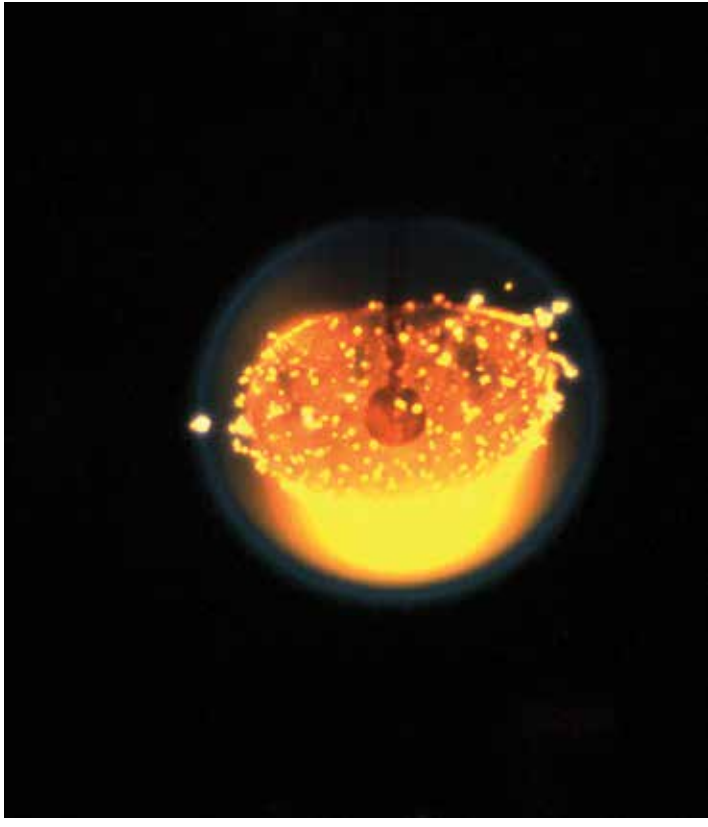
Understanding how peripheral sensory neurons remodel in arthritis is crucial to defining how disease progression may influence pain. Research in the lab focuses on understanding degenerative mechanisms of musculoskeletal tissues and developing therapeutic approaches to halt and reverse musculoskeletal degeneration.

Berke is a member of Professor Lori Setton's lab.

settonlab.wustl.edu

July

S	M	Tu	W	Th	F	Sa
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1



Phillip Irace

Doctoral candidate in the Department of Mechanical Engineering & Materials Science

The combustion experiment, Flame Design, is being performed on the International Space Station. The goal of Flame Design is to improve our understanding of soot formation and flame extinction. The results could enable the design of robust, soot-free flames and the optimization of oxygen-enriched combustion for use in long-term carbon capture and storage.

Irace is a graduate student in the Lab for Advanced Combustion and Energy Research (LACER). He is studying spherical diffusion flames in microgravity under the NASA project Advanced Combustion via Microgravity Experiments (ACME).

Irace is a member of Professor Richard Axelbaum's lab in the Department of Energy, Environmental & Chemical Engineering.

August

S	M	Tu	W	Th	F	Sa
26	27	28	29	30	31	1
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16	17	18	19	20	21	22
23/30	24/31	25	26	27	28	29

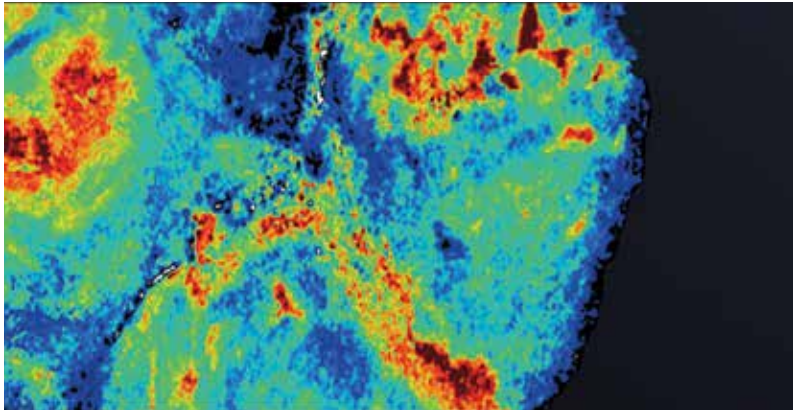
Michael Vahey

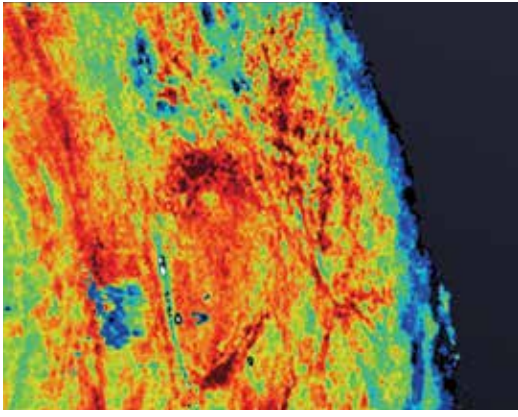
Assistant Professor in the Department of Biomedical Engineering

Mucus (green) secreted by differentiated airway epithelial cells (magenta & yellow) serves as a protective barrier against infection that viruses have evolved mechanisms of penetrating.

Vahey's research focuses on developing imaging methods and microfluidic technologies to understand infectious diseases, with an emphasis on studying how viruses such as influenza A navigate and shape their hosts to replicate.

» **vaheylab.wustl.edu**





September

S	M	Tu	W	Th	F	Sa
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	1	2	3

Yifeng Zeng

Doctoral candidate in the Department of Biomedical Engineering

This image depicts a 3D scan of ovarian tissues and the en face scattering coefficient maps derived from malignant and normal ovaries. Histogram analysis of these maps reveals distinct quantified differences suggesting the feasibility of using optical scattering properties to assist in ovarian cancer diagnosis.

Research in the Optical and Ultrasound Imaging Laboratory focuses on understanding of optical properties of human ovarian and colorectal cancers. Yifeng Zeng's research using imaging analysis and machine-learning techniques reveals that optical scattering is a significant biomarker of human ovarian and colorectal malignancy.

Zeng is a member of Professor Quing Zhu's lab.

» **opticalultrasoundimaging.wustl.edu**

October

S	M	Tu	W	Th	F	Sa
27	28	29	30	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Leanne Iannucci

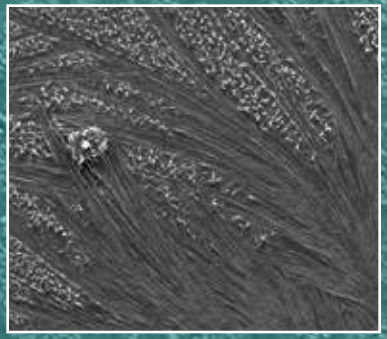
Doctoral candidate in the Department of Biomedical Engineering

This is an image of a bovine flexor tendon stained with picrosirius red and imaged using polarized light microscopy to visualize the native collagen fiber alignment of the tissue. This image and knowledge obtained about the extracellular matrix microstructure is used as a ground truth to compare to signal obtained using rQPLI.

Iannucci is developing a reflected light-based quantitative polarized light imaging technique (rQPLI) for real-time evaluation of collagen fiber alignment in physiologically-loaded musculoskeletal soft tissues.

Iannucci is a member of Associate Professor Spencer Lake's lab in the Department of Mechanical Engineering & Materials Science.

lakelab.wustl.edu



November

S	M	Tu	W	Th	F	Sa
1	2	3	4	5	6	7
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22	23	24	25	26	27	28
29	30	1	2	3	4	5

Mojgan Kouhnavard

Postdoctoral researcher in the Department of Energy, Environmental & Chemical Engineering

This is a SEM image of Dopant-free PEDOT thin film on FTO substrate which will be used as a hole-transporting layer for a perovskite solar cell. Other layers of the cell will be designed to be matched to this layer and measure its efficiency and stability in ambient conditions.

Kouhnavard is a member of the Aerosol and Air Quality Research Laboratory. The focus of this group is the use of aerosol science and technology to harness this resource to provide environmentally-benign energy production methodologies. The group relies on gas phase synthesis methodologies to produce novel materials to harvest solar energy. This work is in collaboration with Assistant Professor Julio D'Arcy in the Department of Chemistry at WashU.

Kouhnavard is a member of Professor Pratim Biswas' lab.

aerosols.eece.wustl.edu

December

S	M	Tu	W	Th	F	Sa
29	30	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2

Michael David

Postdoctoral researcher in the Department of Mechanical Engineering & Materials Science

This image shows NIH3T3 fibroblasts embedded in a collagen gel that were stained to determine the number of viable cells (green), dead cells (red), and cell nuclei (blue).

The Lake Lab investigates the potential efficacy of anti-fibrotic drugs, simvastatin and losartan, to prevent post-traumatic joint contracture of the elbow, a debilitating disease characterized by significant elbow stiffness and reduced range of motion following an injury to the elbow. David explores various delivery parameters (e.g., concentration and timing) that will best enable simvastatin and losartan to influence cell health and tissue contractibility in the elbow by using a collagen gel contraction assay.

David is a member of Associate Professor Spencer Lake's lab.

lakelab.wustl.edu