

MitoCare 2020

MitoCircle Seminar Series, 2020 Edition



MitCare



MitoCircle - The Virtual Edition

MitoCare Center for Mitochondrial Imaging Research and Diagnostics
Department of Pathology, Anatomy and Cell Biology
Thomas Jefferson University

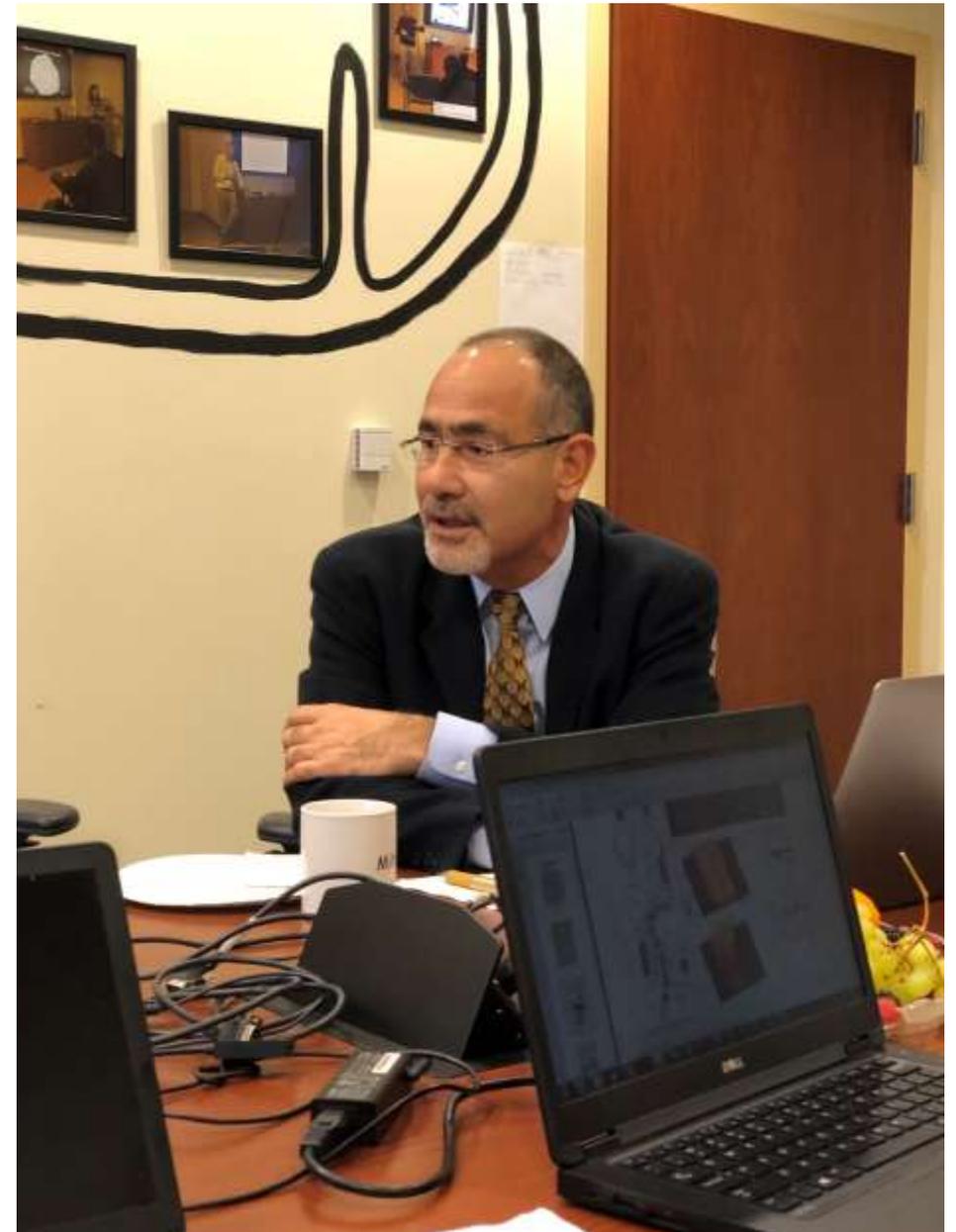
Location: Zoom
Winter-Fall 2020

- Jan 22, Noon ****Department of Pathology, Anatomy and Cell Biology Seminar****
Gokhan Hotamisligil, MD, PhD, Harvard T. H. Chan School of Public Health
Title: Architectural regulation of endoplasmic reticulum in metabolic health and disease
- July 14, 9AM Raj Chakrabarti, Ph.D., Post-doctoral fellow, Henry Higgs' lab, Department of Biochemistry, Dartmouth Medical School
Title: Maintaining the Powerhouse: Multiple roles of actin filaments on mitochondrial dynamics
- Sept. 21, 9AM Marco Tigano, Ph.D., Post-doctoral fellow, lab of Agnes Sfeir, NYU
Title: Cellular responses to mitochondrial DNA breaks and deletions
- Nov 30, 11 AM Andrew Halestrap, Ph.D., Emeritus Professor of Biochemistry, School of Biochemistry, University of Bristol
Title: Reflections on the molecular mechanism of the mitochondrial permeability transition and its role in ischemia / reperfusion injury of the heart

Gokhan Hotamisligil's seminar at Jefferson on ER in metabolism



Gokhan also visits MitoCare for some discussions



Chris Buzas a former MS student/tech and a current GI surgeon stops by to help his 2 older kids to see research





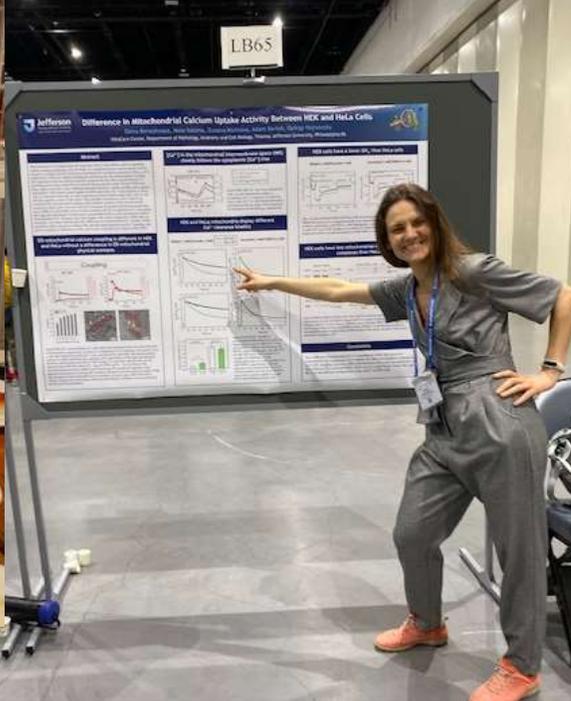
Langos Day 2020

brought to you by
Chef Carmen
and
Kitchen Hand Gyuri H
+ Assorted Langos Assistants



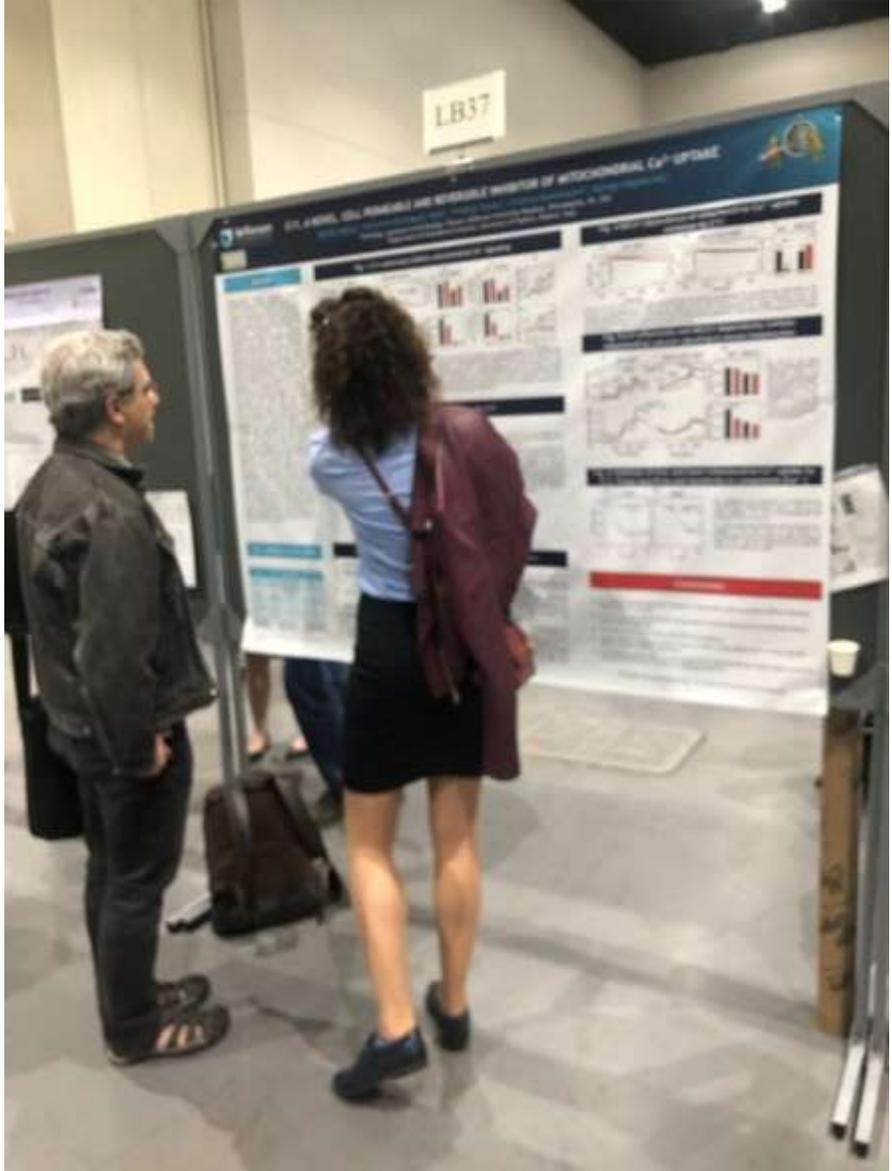
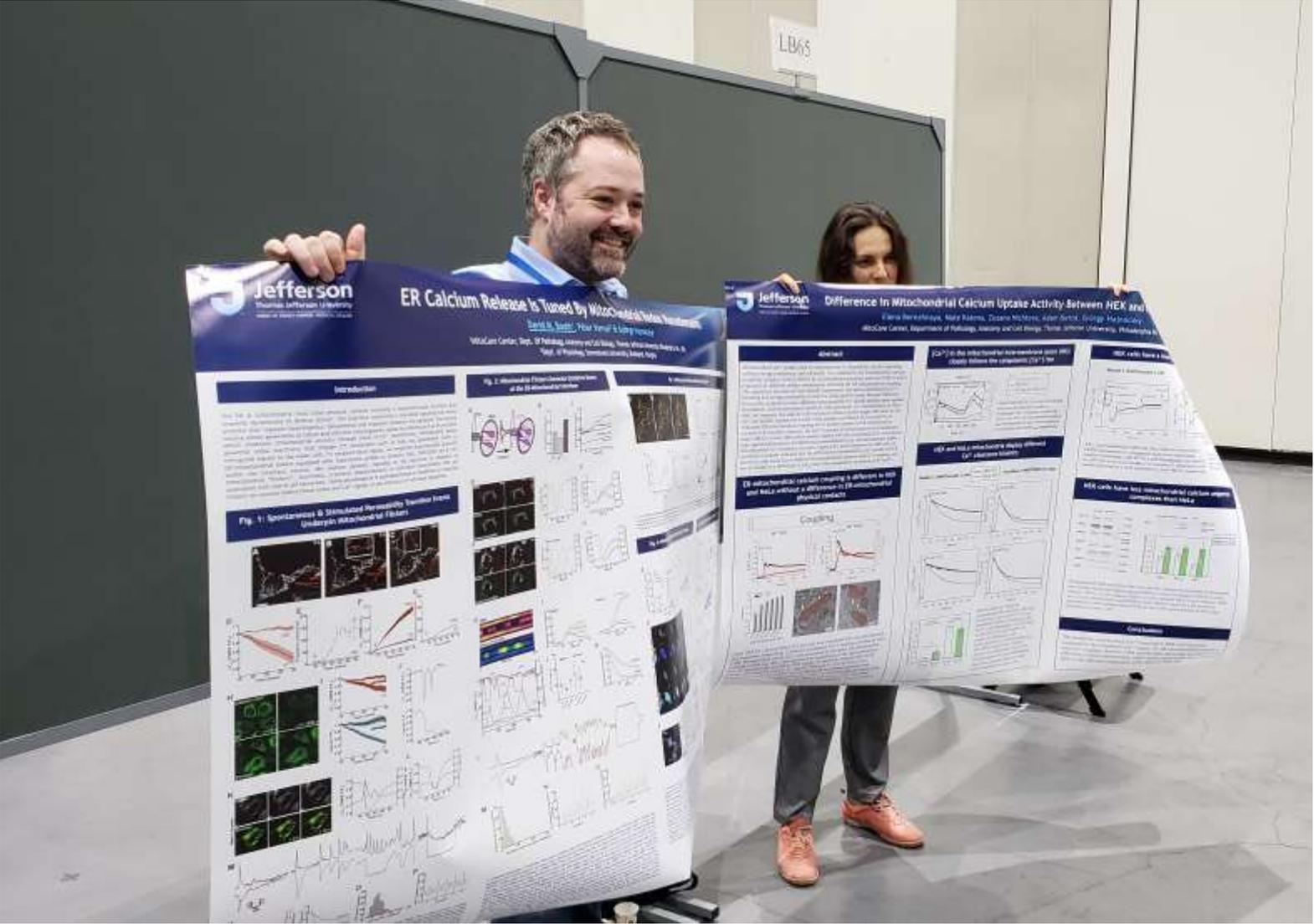
Celebration of a Seifert group paper:

Biophysics 2020 San Diego



Gyuri's
plenary talk

BPS meeting Posters of Dave, Elena and Kata..... visited by Gary Yellen



Labmeetings Before and During COVID-19 times

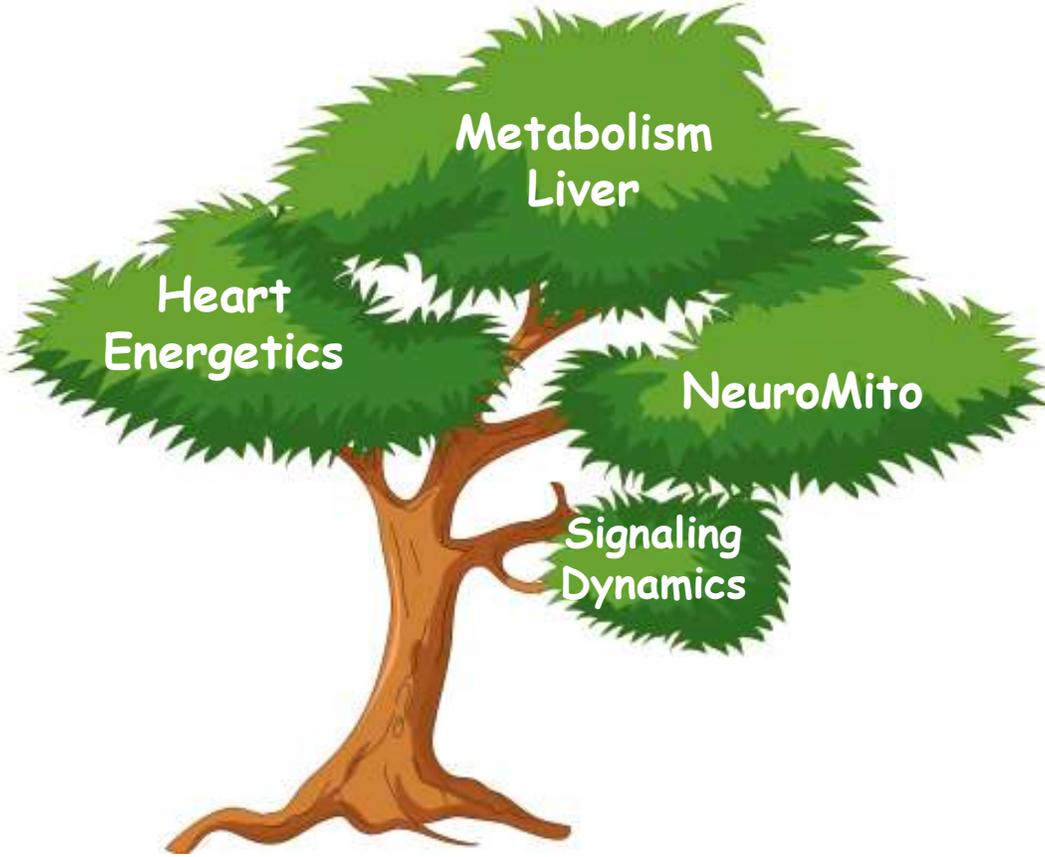


Fabrication of new PTI cuvette holders at a historic UPENN machine shop that once created the rigs for Britton Chance



Mike Carman

Vision on the future of MitoCare



Mit  Care

Starting a basic and clinical research program into neurodegeneration
with Bob Sergott
and Kurt Riegger

Making the Invisible Visible

Introducing the

Jefferson NeuroMito[®] Platform

A Comprehensive Research Program Dedicated to
the Discovery of Mitochondrial Pathways, Addressable
Therapeutic Targets, and Life Cycle Management

A joint seminar sessions with SuperMito of UCLA



Noro accepts a prestigious position at AACR and returns for wrapping up with Mate some MCU matters



NIH funds a grant supplement for a FLIM system for MitoCare

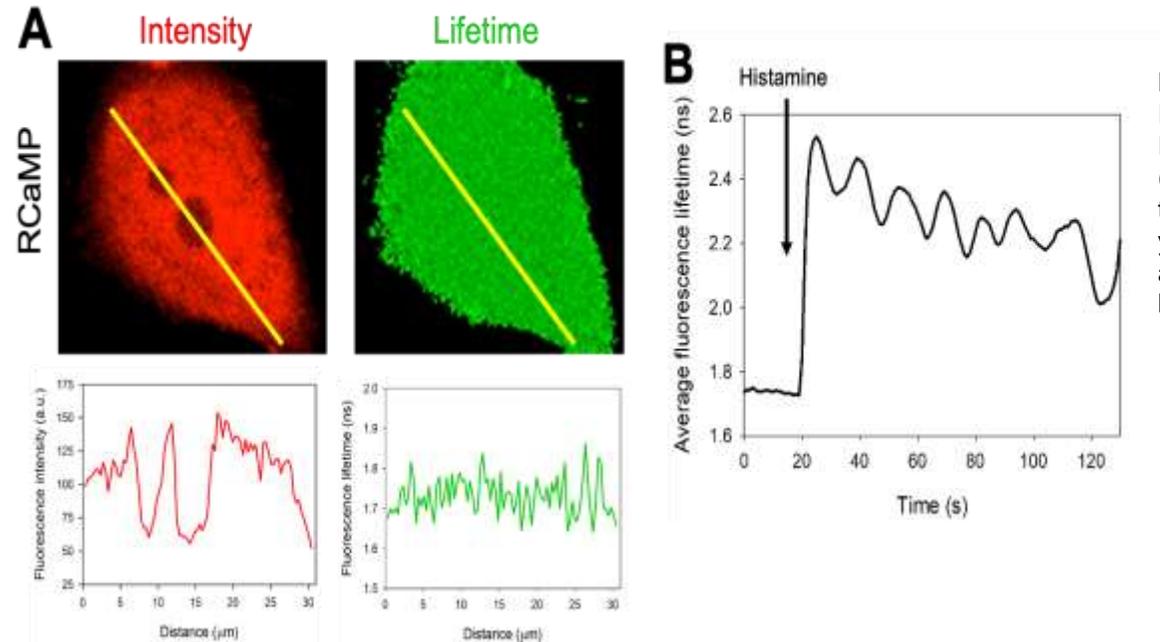
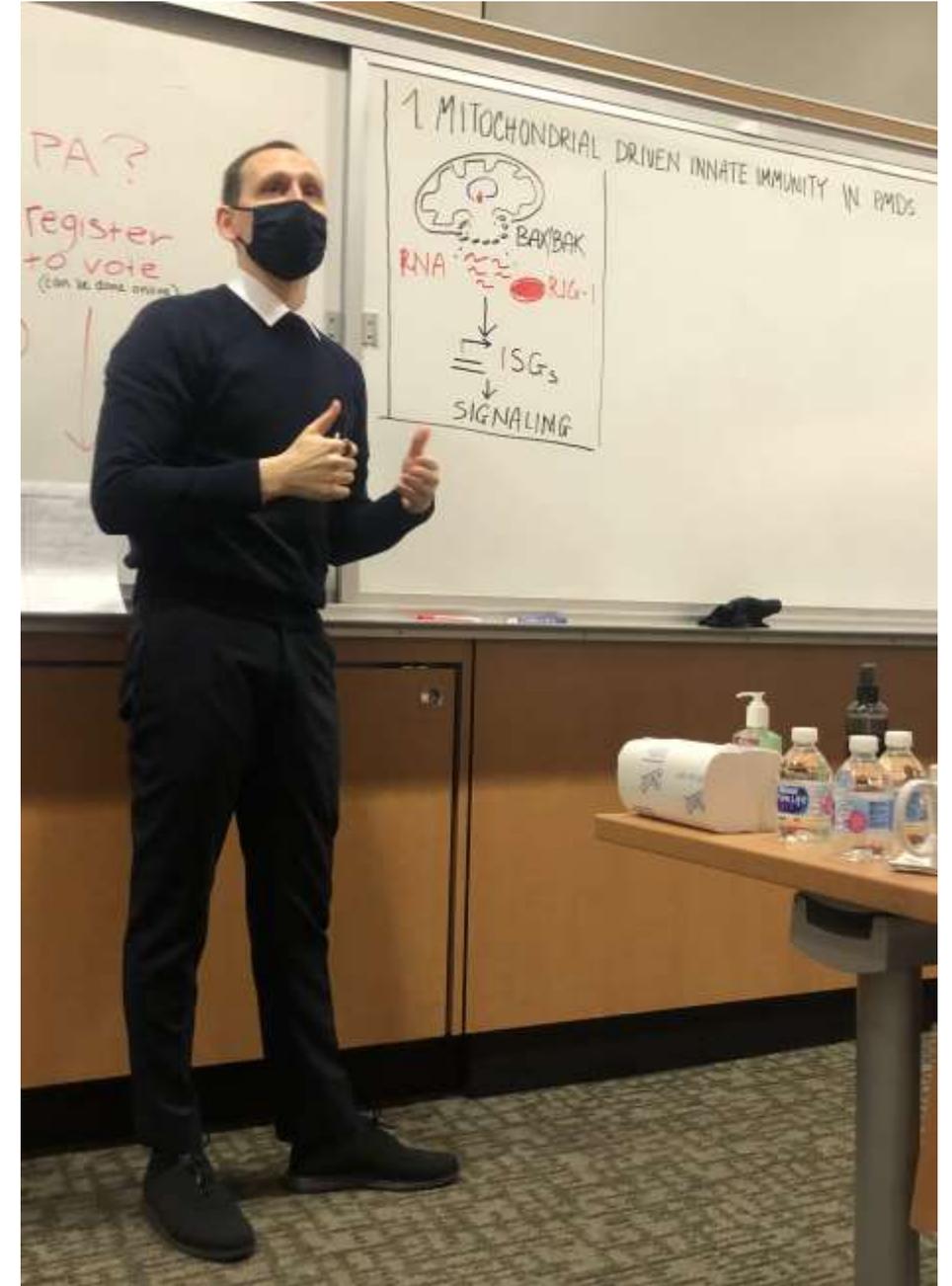


Figure 1 FLIM imaging of $[Ca^{2+}]$ by RCaMP. A) Images of a HeLa cell expressing the Ca^{2+} sensor, RCaMP, visualized by intensity (red) and lifetime (green) measurements. Line profiles plots show the variation of intensity and lifetime along the yellow line of the images. **B)** The $[Ca^{2+}]$ response as determined by FLIM of the same cell after histamine stimulation is plotted.

The signature advantage of FLIM is that values obtained represent absolute physical properties of the fluorophores, obviating the common errors and artifacts that can arise from the background subtractions, normalizations and calibrations needed with intensity-based imaging. However, in the past, FLIM didn't offer the temporal resolution to resolve the kinetic of intracellular calcium signals and was also a very expensive technology. After the original RO1 application was submitted, major advances in FLIM technology greatly increased the image acquisition speed and impressively, a FLIM camera-based system allows up to video-rate FLIM imaging in the frequency-domain. This system has become commercially available and at a price that is in the range of the present opportunity; \$146,031 from Imagine Optic.

New NIH grant starts for SKJ
and
a FARA grant is approved for Erin

Faculty Recruitment: Marco Tigano's chalk talk



Nov 2020:

In recognition of
Erzsi Ligeti, Professor,
Department of Physiology,
Semmelweis University,
upon her retirement.

Dr. Ligeti did foundational
research on the mitochondrial
phosphate carrier

Gratulálunk!

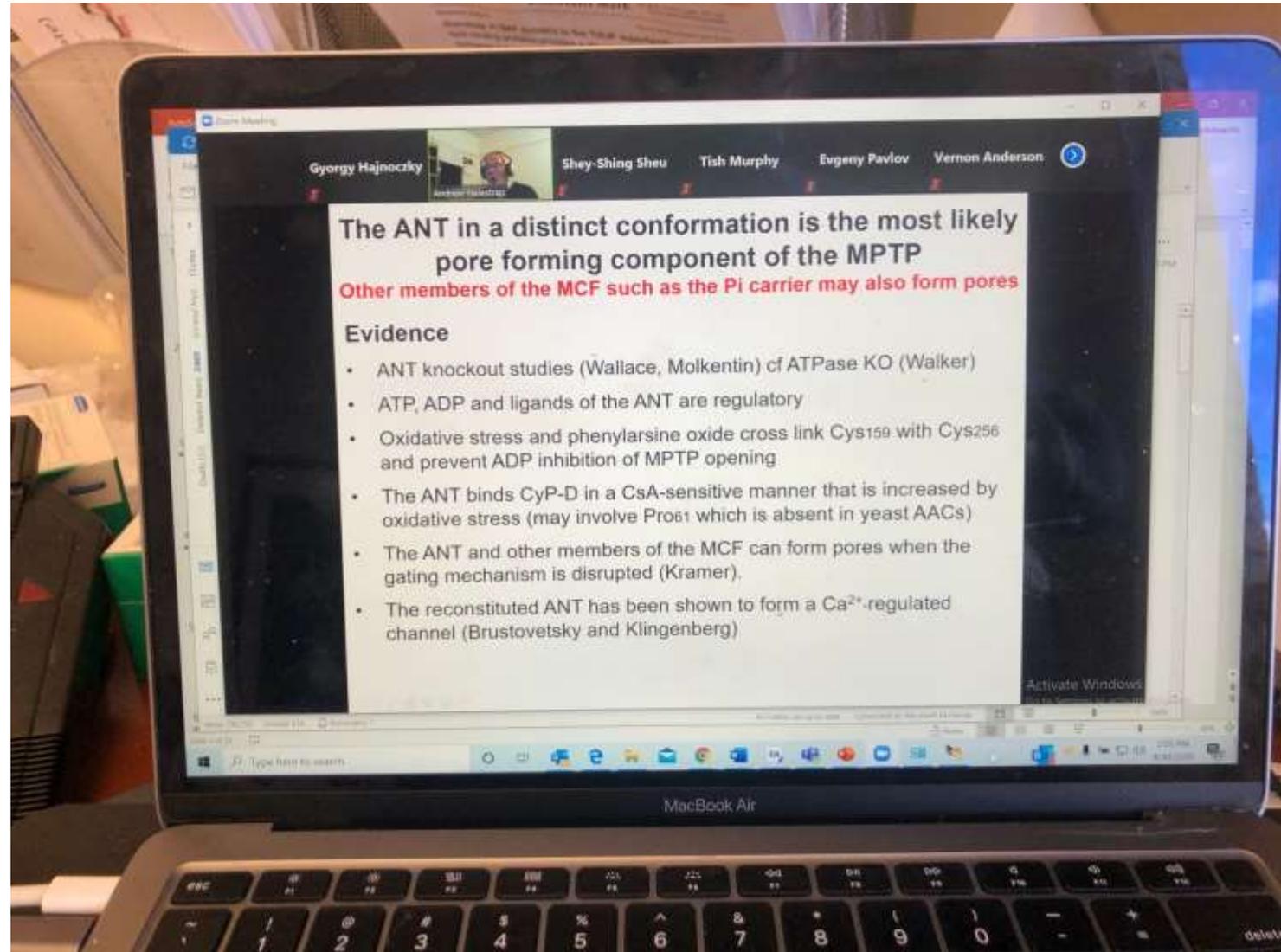
Congrats
from
Philly!



An NIH grant
with the rare
PERFECT score
recognition

Application	Study Section
Award Document Number: RDK125897A	Scientific Review Group: MIST
FSR Accepted Code: N	Council Meeting Date (YYYY/MM): 2021/01
Snap Indicator Code:	Meeting Date: 10/13/2020
Impact Score: 10	Meeting Time: 10:00
Percentile: 1.0	Study Roster: View Meeting Roster
For information about next steps: Click here	
Early Stage Investigator Eligible: N	
New Investigator Eligible: N	
Eligible for FFATA Reporting: Yes	

Andrew Halestrap presents a seminar at MitoCircle



At the



CHILEAN SOCIETY FOR CELL BIOLOGY
2020 Colloquium Series in Cell Biology
December 1st – 3rd, 2020

Verónica announces the
start of MitoCircle Chile

Colloquium in Mitochondrial Integrated Dynamics

Organizers: Verónica Eisner, PUC and Valentina Parra, UChile.

December 2, 11:00-14:30 hrs.

Symposium

11:00-11:30. Valentina Parra, Universidad de Chile, Chile.

“System Biology Approach of the Down Syndrome Critical Region 1 Gene, Rcan1: Implications in mitochondrial biology, cellular proliferation and differentiation”

11:30-12:00. Álvaro Elorza, Universidad Andrés Bello, Chile.

“How many actors and physiological roles are for Mitophagy?”

12:00-12:30. Karin Busch, University of Münster, Germany.

“The spatio-temporal dynamics of mitochondrial ATP synthase”

12:30-13:00. Alicia Kowaltowski, University of Sao Paulo, Brazil.

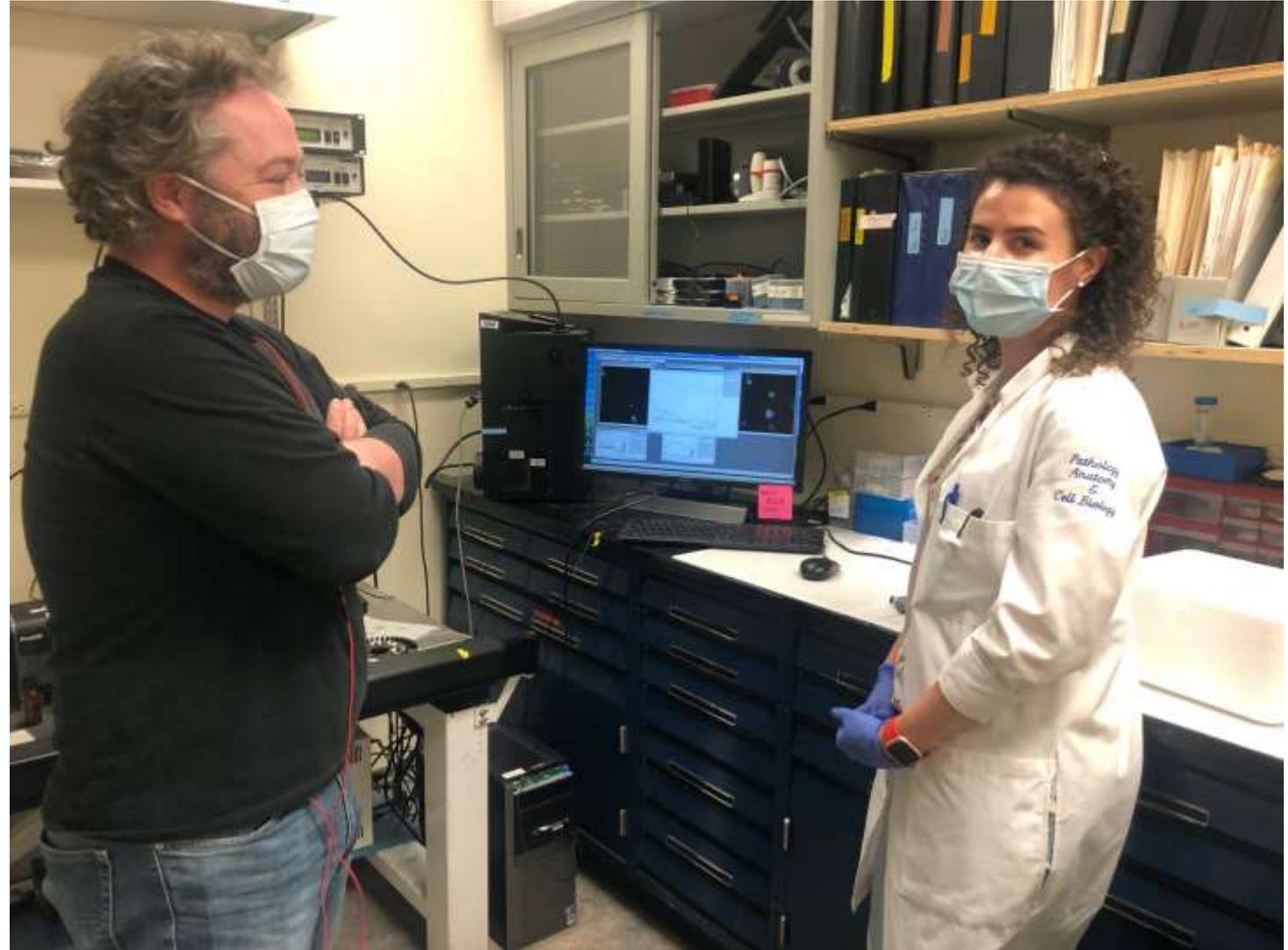
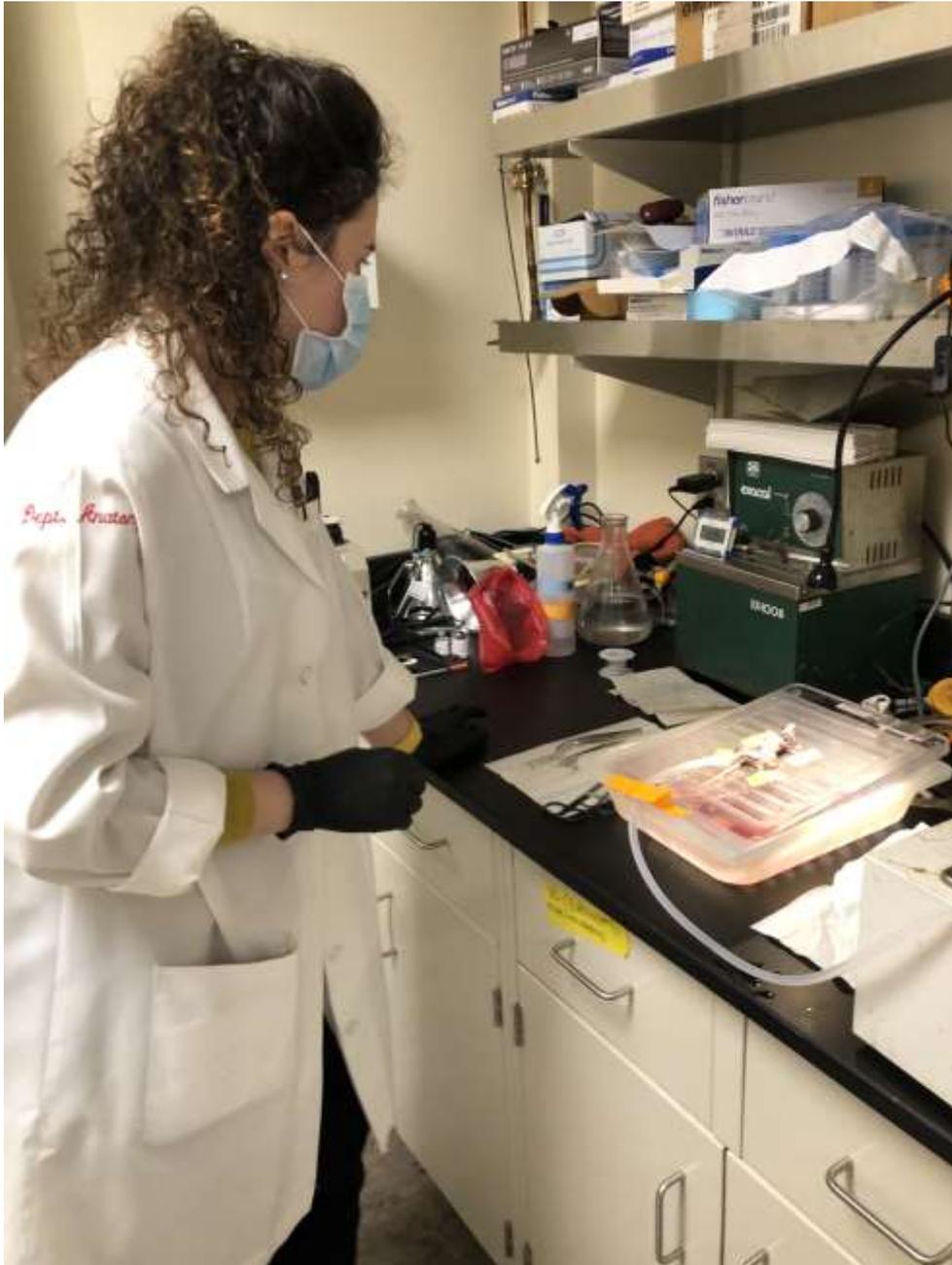
“Does size matter for mitochondria within a cell?”

Plenary Lecture

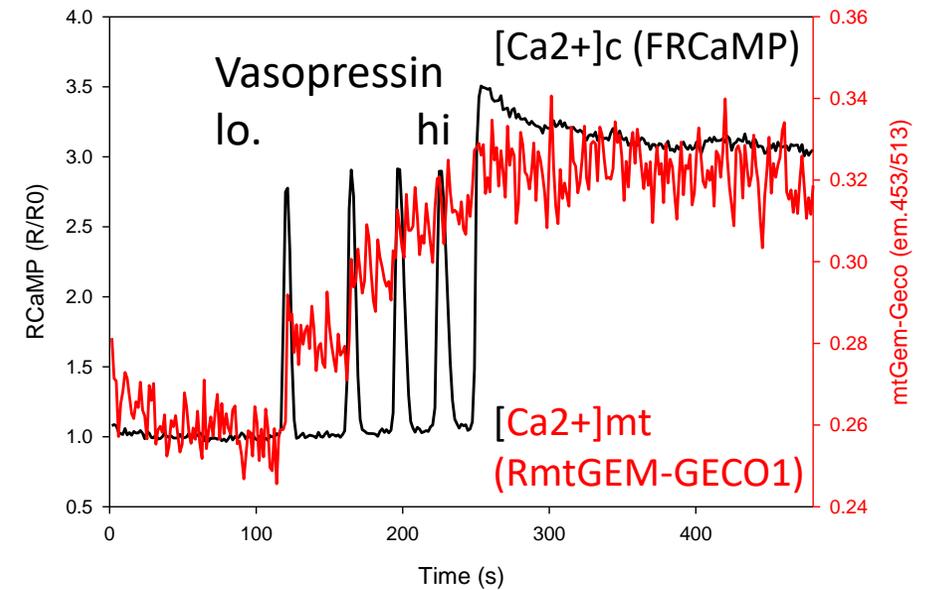
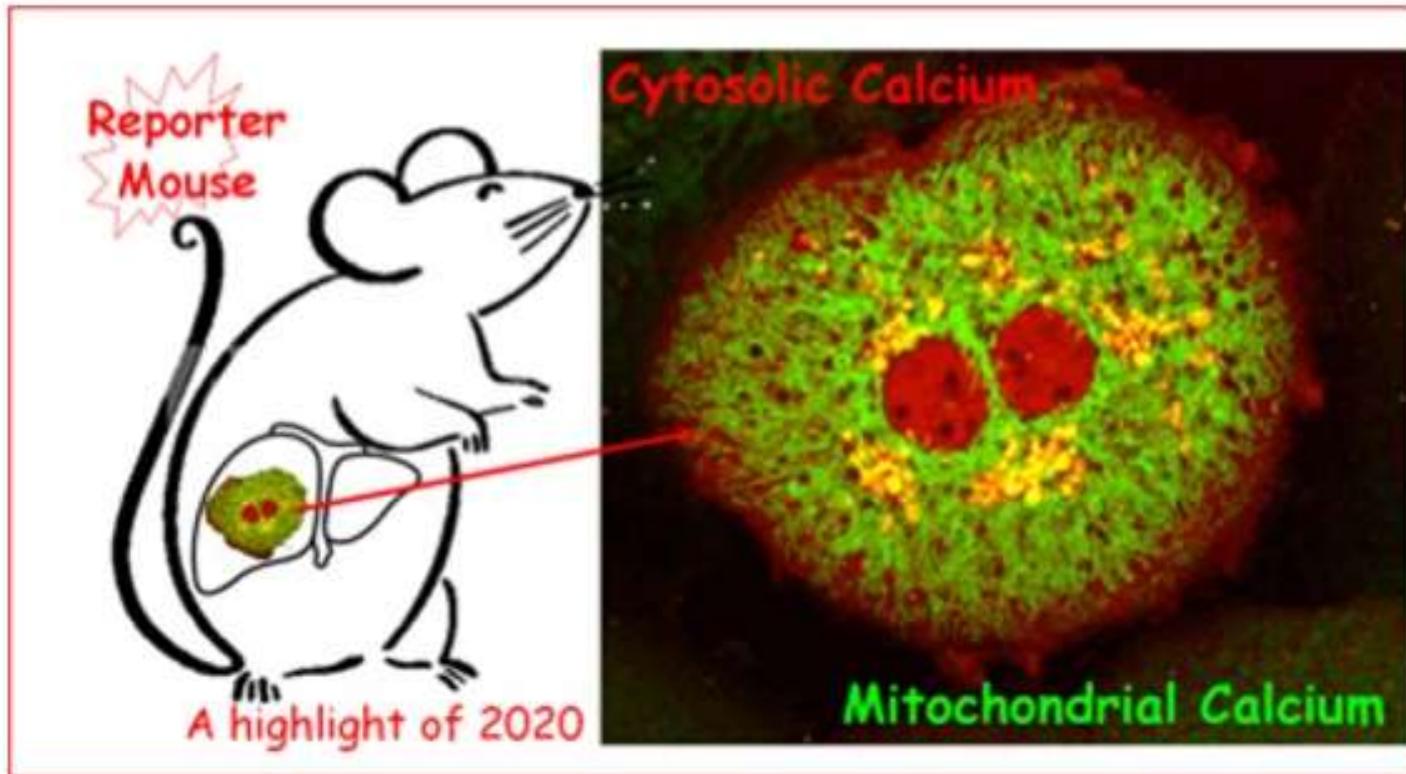
13:30-14:30. György Hajnóczky. Thomas Jefferson University, Philadelphia, PA.

Title: “Mitochondrial communication”

Validation of the Contact and Calcium Spy Mice



The Calcium Spy Mouse: conditional RCaMP and mtGEM-GECO1 knock in



Seifert Lab: some insights and achievements in 2020

Carmen's new "Extracts" from the Acot and acyl-CoA world:

- Publication with our collaborator: Quantification of lactoyl-CoA by liquid chromatography in mammalian cells and tissues. Varner EL ... Bekeova C, ... Seifert, EL ... Snyder SW. Open Biol. 2020
- Multiple proteomics data sets support that Acot2 has no close friends (tho' that doesn't stop Acot2 from potentially impacting metabolism)

News coming soon from Cesar and Briyanna on a new Friedreich's Ataxia mouse model:

- Daily treadmill running improves exercise capacity in mice with Frataxin loss
- Two manuscripts are cooking ... and almost done

Big insights from Ji using mice studied intact and "unharassed" (spontaneously active):

- Mice with PiC kd in muscle run as much as control mice, but with a totally different 24-hr pattern
- Mice with Acot2 kd in muscle prefer to oxidize carbohydrate over fat, even when fed a high fat diet

Cesar and Arijita explore Ca^{2+} handling when high capacity Pi uptake via the PiC is lacking:

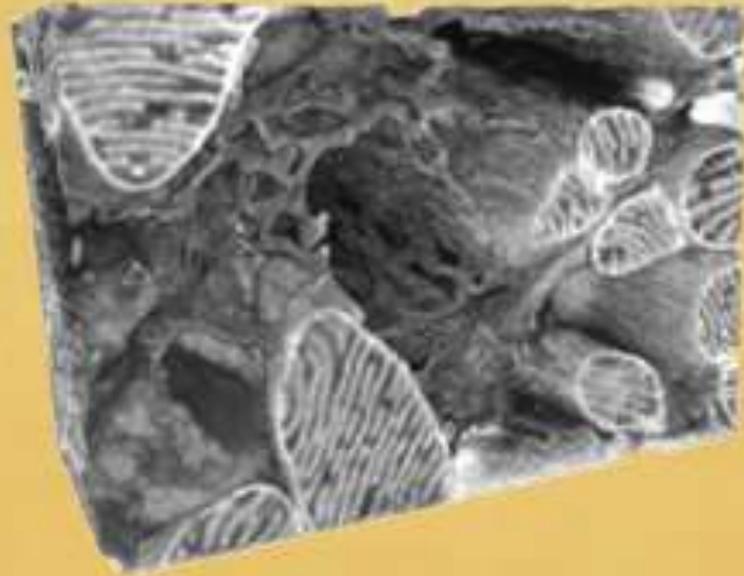
- Astonishingly little PiC is needed for mito Ca^{2+} uptake ... tho' more PiC is needed for matrix Ca^{2+} buffering
- PiC loss in muscle dramatically lowers cytoplasmic Ca^{2+} during high frequency fiber stimulation

New grant awarded from Friedreich's Ataxia Research Alliance!!

Just before Christmas a Donation is confirmed for a FIB-SEM equipment (\$1.3M) for MitoCare



Below. The same heart cell showing mitochondria and sarcoplasmic reticulum, using leading-edge FIB-SEM technology. (Csordas and Nichtova)



Coming Soon: Focused Ion Beam Scanning Electron Microscopy (FIB-SEM)

- **The MitoCare Center is poised to be the first mitochondrial research center in the world to acquire FIB-SEM.**
- Automatically generates 3D images with a resolution of 4 nanometer while maintaining a large field of view.
- Unparalleled clarity in the study of the relationship of mitochondria to other subcellular organelles.
- Quantification of structure in 3D allows direct comparison of various samples and provides a powerful tool for diagnostic and therapeutic testing.



Hajnóczy Lab
Dec
2020



2020 ... What a year!



And now ... for 2021!

The MitoCare team wishes you and yours
a happy and healthy Holiday Season
and the very best for 2021!

