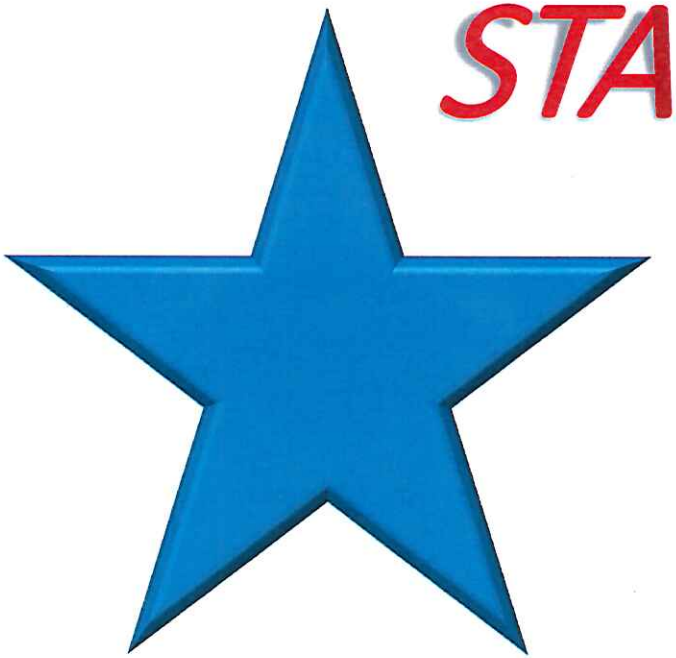


# STAR Informational Session

**Colleen Fitzgerald, MD**

**and**

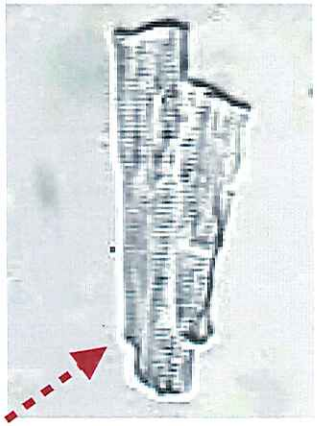
**Kim Foreman, PhD**

# Dr. Zima Lab

The goal of our research is to define molecular mechanisms that control cardiac calcium (Ca) homeostasis in the normal and disease states, with particular focus on the ryanodine receptor (RyR) Ca release channel.

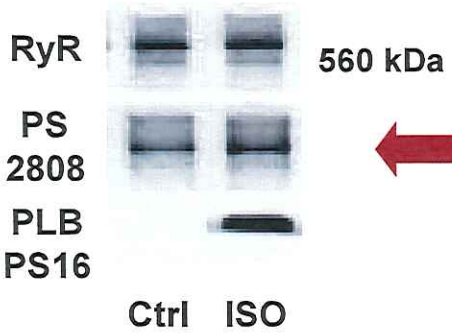
*Isolated Heart*

*Cardiomyocytes*

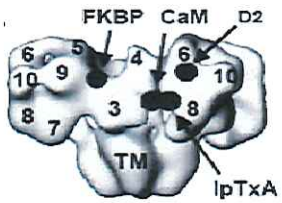


*Confocal Ca Imaging*

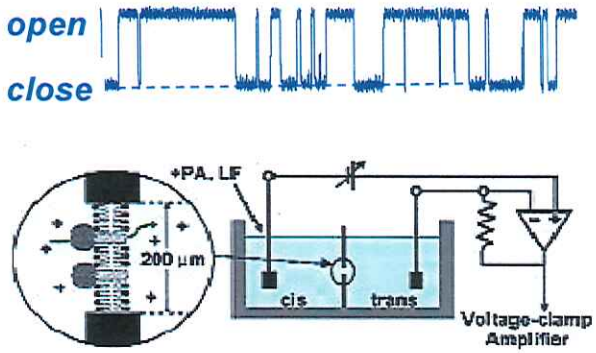
*RyR Molecular Biology*




*RyR Structure*

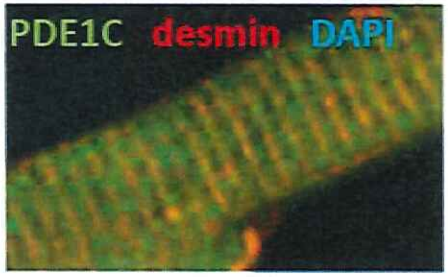


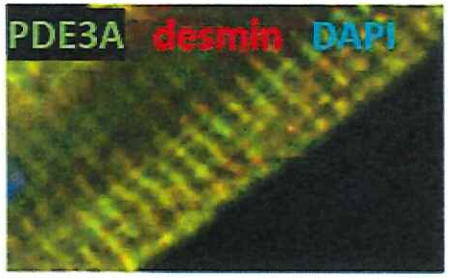

*RyR function in Lipid Bilayers*



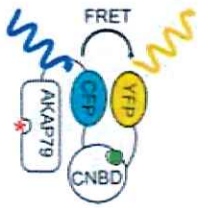
# Grace Muller, PhD

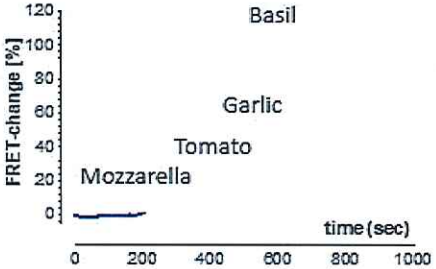
## Problem: interrogate processes occurring in a tight space

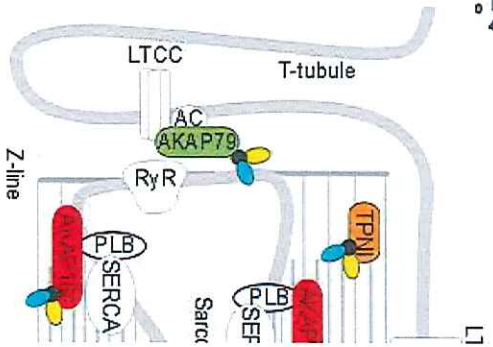



## Approach 1

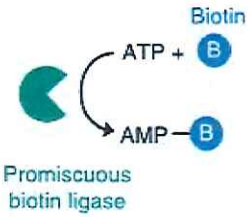


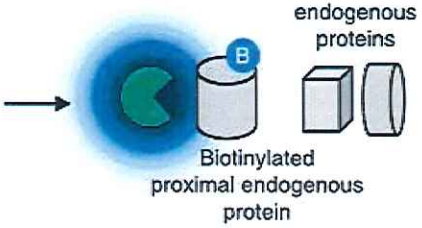



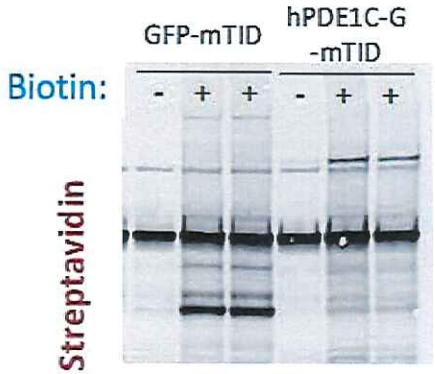




Zaccolo Laboratory

## Approach 2



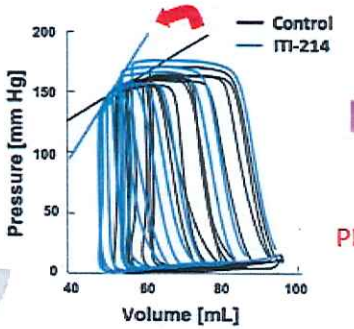




Ting Laboratory

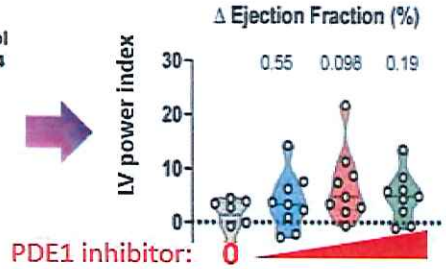
## Pre-clinical (dog)

Hashimoto and Kim et al. Circ ('18)



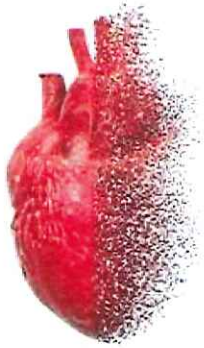

## Human patients

Gilotra et al., Circ HF ('21)




Change in $QT_c$ 5d post (ms)

| Placebo | 214 (90 mg) |
|---|---|
| 6 ± 21 | -16 ± 19 |




Grace Kim Muller, PhD
gmuller@luc.edu
www.mullerheartlab.org

Ivana Kuo, PhD
Asst. Prof, CaMP
M1: Renal & Acid Base FHB
M2: Renal physiol review MHD

# Cardio-Renal Crosstalk

Our lab seeks to understand why genetic kidney disorders (e.g.: polycystic kidney disease) predispose towards cardiac failure, and how heart failure impacts kidney function.

**What STAR STUDENTS learn:**

1. Combo of basic science (biochem and mol biol), cardiac and renal failure mouse models
2. Integrate renal and cardiac physiology and pathophysiology (i.e.: FHB meets MHD)
3. Potential collaborations with nephrologists

**EXAMPLE STAR PROJECTS:**
-What's the natriuretic peptide production like in PKD?
-How is blood pressure regulated in PKD?

**CURRENT STAR AND MEDICAL HONORS STUDENTS**

**BRANDON LANTONIO, M3**
-T35 STAR & Medical Honors Student
-Abstract selected for American Heart Assc. Scientific Sessions, Oral presentation, Nov 2022

**JACY NECZYPOR, M2**
-T35 STAR & Medical Honors Student

**FIND OUT MORE:**

**Email:**
**Ivana Kuo:**
ikuo@luc.edu
**Brandon:**
blantonio@luc.edu
**Jacy:**
jneczypor1@luc.edu

**Tamer Refaat Abdelrhman, MD PhD MSCI**
**Associate Professor, Director of Clinical Research, Department of Radiation Oncology**
**Interests:** Breast Cancer - GI malignancies *(Esophageal, hepatobioliary, pancreatic, colorectal, anal)*

## STAR / Honors Students 2022:

### ✓ Meaghan Flynn:

**Project:** *MRI-guided Real-Time Online Adaptive Radiation Therapy for pancreatic Cancer patients*

***Experience obtained:*** *Learning how to identify organs on abdominal MRI, how to delineate organs and cancer, concepts of radiation therapy with advanced adaptive MRI guidance to patients with pancreas cancer, how to interpret daily anatomic variation on MRIs and how to work on an abstract / manuscript and interact with collaborators.*

**Outcomes:**

- First Author Abstract to St. Albert's Day (in preparation).
- First Author Abstract to American Society of Radiation Oncology 2023 (in preparation).
- Second Author on a manuscript.

### ✓ Laila Hasnain:

**Project:** *Incidence and risk factors of clinical and radiological breast lymphedema after adjuvant radiation therapy.*

***Experience obtained:*** *Learning how to interpret mammograms, concepts of breast cancer radiation therapy planning and dose interpretation, browsing EMR and identify patients with clinical lymphedema, and obtain relevant clinical data, how to interact with collaborators from different departments (Radiation Oncology, Breast Surgery, radiology, & Medical physics) and how to work on an abstract / manuscript and interact with collaborators.*

**Outcomes:**

- Grant obtained from the Department of Surgery (10K)
- First Author Abstract to St. Albert's Day (in preparation).
- First Author Abstract to American Society of Radiation Oncology 2023 (in preparation).
- Second Author on a manuscript.

# STAR Opportunity – Investigator: Omer Iqbal, MD.

**1. Pathogenesis of Stevens Johnson Syndrome/Toxic Epidermal Necrolysis (SJS/TEN)**

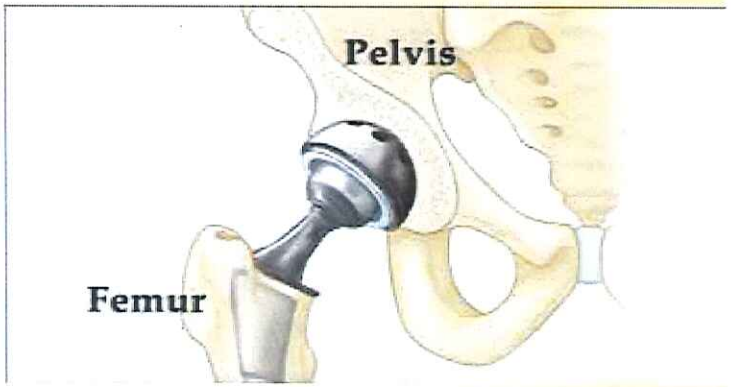
- SJS/TEN are rare Severe Cutaneous Adverse Reactions (SCARs) – most often drug-induced.
- Causes sloughing of skin and involves multiple organs.
- Eyes are often involved and causes conjunctivitis which may lead to corneal blindness
- Pathogenesis is not completely understood. Various cytokines may have a role in its pathogenesis.
- We have a collection of slides prepared from skin biopsy samples from patients with confirmed SJS/TEN and Lichen Planus (controls)
- Under an IRB approved protocol, students can study the expression of selected cytokines using immunofluorescence microscopy.

**2. Pathogenesis of Keratoconus**

- Keratoconus is a disorder of the eye that causes thinning of the cornea.
- Patients with keratoconus experience blurry vision, double vision, near sightedness, irregular astigmatism, light sensitivity and poor quality of life.
- Pathogenesis of keratoconus is not completely understood. Inflammation may play a role.
- We have a collection of slides prepared from corneas from patients with Keratoconus and Fuch's Dystrophy (controls).
- Under an IRB approved protocol, students can study the expression of selected cytokines using immunofluorescence microscopy.

# Nicholas Brown

LOYOLA UNIVERSITY HEALTH SYSTEM




- STAR mentor for 5 years
- Hip and Knee Surgeon
- Predominantly clinical research looking at outcomes/complication related to joint replacement
- Reach out if you are interested!

- Current STAR Student
  - Ryan White
- No former STAR students as a started at Loyola in 2021
- Research Interests
  - Clinical outcomes related to primary and revision total knee & hip arthroplasty

Daniel R. Schmitt, MD
Assistant Professor
Associate Program Director
Orthopaedic Surgery
Loyola University Medical Center

# Ashley Levack, MD, MAS

Orthopaedic Trauma Surgeon

Burn Shock Trauma Research Institute
Infectious Disease &Immunology Research Institute

- Translational research:
  - Local antibiotic strategies for prevention and treatment of implant associated orthopaedic infections, characterizing biofilm formation on orthopaedic implants
  - Prior STAR Mentees
    - Samuel Shing – The effect of shelf life on antiobiotic loaded calcium sulfate beads for use in orthopaedic infection
    - Patrick Lawler – Thermal stability of dalbavancin antibiotic in a PMMA model

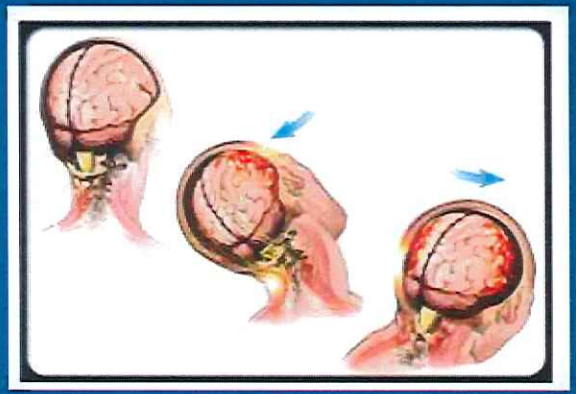
- Clinical research:
  - Evaluation of patient reported outcomes in orthopaedic trauma
  - Prior STAR Mentees
    - Robert Kelly – Evaluation of retrospective baseline PROMIS scores in orthopaedic trauma patients
    - Ho Bin Kim - Evaluation of patient reported outcomes after native hip dislocations

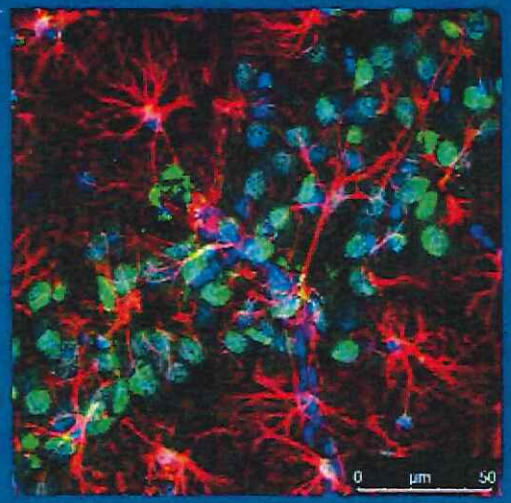
# Foecking Lab

## Major Research Themes/Interests

Project #1: Development of Therapeutic Strategies for the Sequalae of Repetitive Mild Traumatic Brain Injury

Project #2: Role of Senescent Astrocytes in Repetitive Mild Traumatic Brain Injury and Aging





### Current Lab Members

Susanna Byram, MD/PhD
Krista Lotesto
Michael Volyanyuk, MS
Jake Exline
Yewon Rhee
Eva Napierkowski
Lizzy Sager

### Former STAR students

Eva Napierkowski
Meaghan O'Hara
Matthew Girgis
Jane Schumacher
Stephen Statz
Daniel Balcarcel
Grant Turek
James Park
Thomas O'Connell
Patrick Carpenter

### Primary Techniques/Expertise

- Animal Behavioral Analysis and Microsurgery
- Immunocytochemistry, Western Blotting, Cell Culture, RT-PCR, Confocal Imaging

# Emergency Medicine STAR Projects

Loyola University Medical Center

| Previous STAR Projects |
| --- |
| Educational Interventions in the ED: What are We Waiting For? (educational video on CPR) |
| Envisioning Trauma-Informed Care in the Emergency Department: Understanding Knowledge, Practices, and Barriers of Trauma-Informed Care and Evaluating the Efficacy of An Educational Intervention |
| Asking Saves Kids: a firearm injury prevention campaign in a the ED |
| Evaluation of Virtual versus In-Person Suturing Workshops |
| Predictive Factors in ED HIV Testing Refusal |
| Predictors of Higher-Risk Opioid Prescribing in the ED |
| Intranasal Ketamine as a Supplement to Local Anesthesia to Reduce Pain Associated with Minor Procedures in the ED |

| Potential STAR Projects 2023 |
| --- |
| (Continuing) Intranasal Ketamine as a Supplement to Local Anesthesia to Reduce Pain Associated with Minor Procedures in the ED |
| Intranasal ketorolac vs. intramuscular ketorolac for treatment of acute pain in the ED: a randomized controlled trial |
| Factors influencing patients' decision as to whether to be transferred to Gottlieb/MacNeal if at capacity at Loyola (survey) |
| Many other opportunities! |

# Maria L. Wei, MD, PhD

Professor of Dermatology, University of California, San Francisco
Helen Diller Family Comprehensive Cancer Center, UCSF
San Francisco VA Health Care system

Areas of research:

1) Understanding the effect of the environment, such as climate change and ultraviolet radiation, on skin health
2) Developing artificial intelligence and machine learning methods for the screening and diagnosis of skin cancer
3) Evaluating the effectiveness of skin cancer prevention strategies
4) Assessing melanoma outcomes