

# Functional Neurorehabilitation Research (FNR) Opportunities for UAB Medical Students

Victor Mark, MD

for the faculty of the UAB  
Department of Physical Medicine  
and Rehabilitation

- **FNR Scholars Program**

Rationale:

- Increase awareness of the field of PM&R and physiatrists among UAB Medical Students.
- Support School of Medicine educational mission (i.e., scholarly activity and student research)
- Mentor next-generation of leaders in the field, including physician-scientists.

# Potential kinds of research projects

- Join on-going research by mentor
- Student-initiated research (must be approved by mentor)
- Database or chart review
- Clinical study proposed by clinical faculty member, with secondary mentorship by research faculty member, OR
- Research study proposed by research faculty member, with secondary mentorship by clinical faculty member
- These do not qualify: literature review, case report

# Why do PM&R research?

- Explore multiple aspects of medicine
- PM&R requires thorough knowledge of all aspects of medical care
- Therefore, PM&R research can acquaint students with a wide area of medical concerns
- Addressing increasing population of persons living longer with disability
- Co-authorship can be possible, if approved and supported by mentor
- Residency applications and letters of recommendation can reflect the student's research experiences, thus make the student competitive

# Why do PM&R research?

- Continuing student research after summer 2021: This can be possible with arrangement with the mentor and student class and rotation schedule will allow
- Can a student after MS1 conduct PM&R research?: Yes! Many of MS students after 1<sup>st</sup> year have applied for research with the PM&R Department. However, stipends are not available through the School of Medicine after 1<sup>st</sup> year and would need to be arranged by individual mentors

# National Rehabilitation Research Experience for Medical Students (RREMS) option

- Sponsored by the Foundation of the PM&R and the Craig H. Neilsen Foundation
- <https://www.physiatry.org/page/RREMS>
- Summer (8-week) research opportunity with registered PM&R programs (n = 14)
- \$4000 stipend + funding to present research at the February 2022 conference, pending conference site decision
- Applications are due late February 2021
- Students can apply to any registered site
- UAB's PM&R Dept will be a site
- Typically 6-7 students awarded at the national level

# Participating UAB PM&R faculty

# Casey Azuero, PhD, MPH

## General Research Interests:

- Chronic conditions such as:
  - Spinal Cord Injury
  - Chronic Illness
  - Chronic Pain
- Trauma

Design: Open to retrospective or prospective study designs as indicated

Contact Information: [cazuero@uabmc.edu](mailto:cazuero@uabmc.edu)



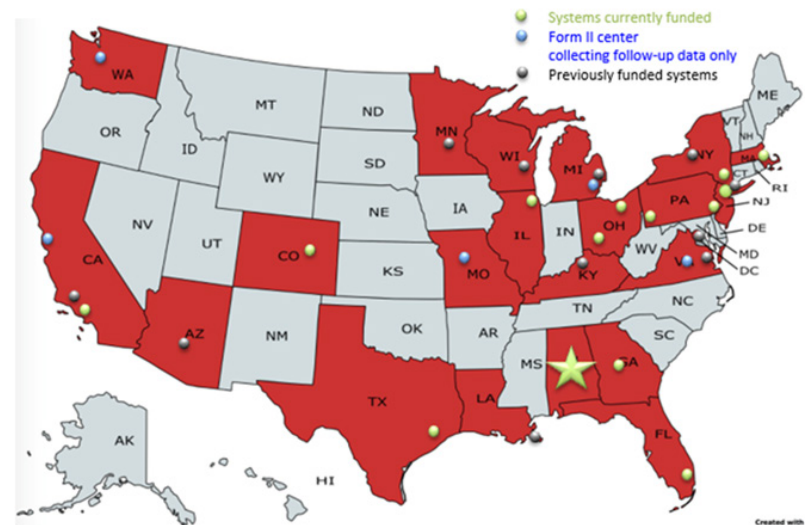
# Robert Brunner, M.D.

- Intrathecal Baclofen use in TBI – database mining
- Contact: [rbrunner@uabmc.edu](mailto:rbrunner@uabmc.edu)

# Yuying Chen, MD, PhD

[yychen@uab.edu](mailto:yychen@uab.edu)

- Research using data from the National Spinal Cord Injury (SCI) Database
- Trauma-Rehabilitation data merge:
  - Study of early predictors of rehabilitation outcomes after SCI
- Weight matters after SCI
  - Obesity and health outcomes
  - Underweight/malnutrition issue
- Social determinants of SCI health
  - Neighborhood factors
  - Racial health disparity



## National SCI Database 1972-2020

- 29 SCI centers
- 34,504 participants
- 125,497 Follow-ups (Years 1, 5, and every 5 years) up to 45 years post SCI

Rachel Cowan, PhD  
recowan@uabmc.edu



### Global Research Theme

Development, testing, and implementation of interventions that improve independence, decrease burden of care, and increased quality of life in persons with SCI

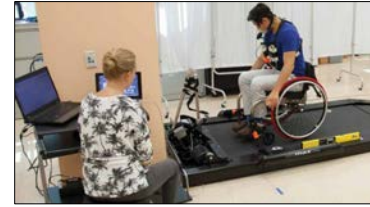
### Current Major Foci

Identifying clinically relevant fitness thresholds in persons with SCI

Defining the magnitude of change required to achieve a clinically meaningful reduction in the demand of manual wheelchair propulsion and identifying user and wheelchair centered opportunities to achieve the reduction.

# Projects available for Research

(open to all interested trainees)



- Existing datasets (no patient interaction)
  - Association between autonomy orientation and functional independence in persons with spinal cord injury (*primarily data analysis and writing, some data entry*)
  - Defining the impact of user weight on the difficulty of manual wheelchair propulsion (*requires post-processing data, data entry, data analysis, and writing*)
- Trainee led clinical pilot studies (patient interaction required)
  - Association between upper extremity strength and ADL/iADL independence in persons with SCI
  - Association between user-wheelchair system characteristics and external propulsion demand in manual wheelchair users

# Sean Hollis, Ph.D.

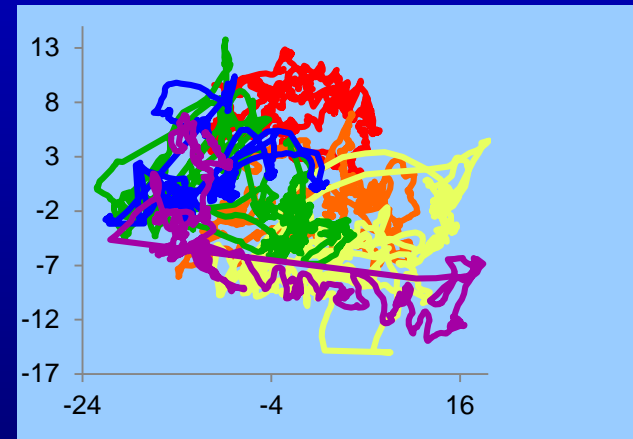
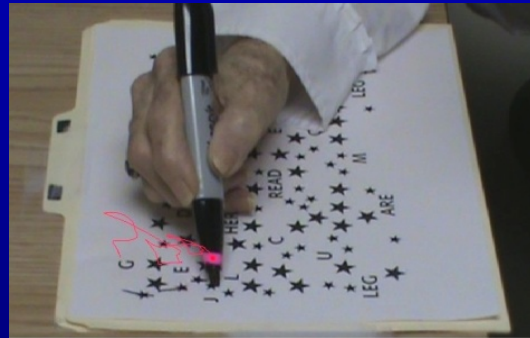
- Long-term follow-ups for TBI
- Contact: [shollis@uabmc.edu](mailto:shollis@uabmc.edu)

# Keneshia Kirksey, M.D.

- Topics in spinal cord injury, resident education
- Contact: [kmkirksey@uabmc.edu](mailto:kmkirksey@uabmc.edu)

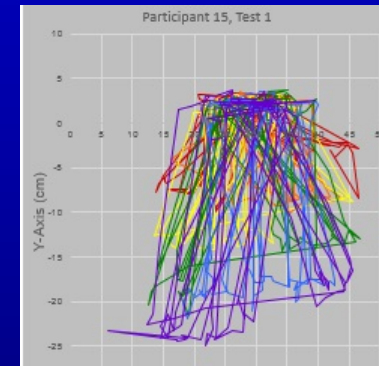
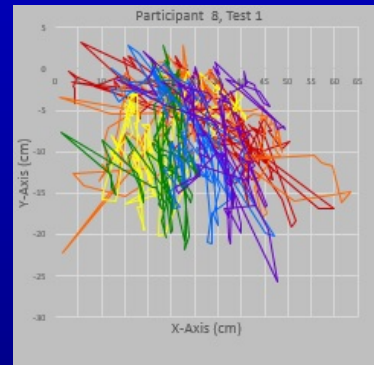
# Victor Mark, M.D.

Video-tracked hand motion, electromagnetic pen tracking, and infrared eye movement capture analysis of visuospatial problem-solving related to disability by neurologically disabled patients



# Victor Mark, M.D.

Infrared eye tracking in neurologically disabled patients in relation to concurrent disability



Eye tracks of neurologic patients. Left, very disorganized searching eye movements, very disabled. Right, highly organized and minimally disorganized.

Contact: [vwmark@uabmc.edu](mailto:vwmark@uabmc.edu)



# Amie McLain, M.D.

- Women with SCI
    - Reproduction and Gynecological Issues
- Contact: [ajackson@uabmc.edu](mailto:ajackson@uabmc.edu)

## **Janet Niemeier PhD -- Research interests**

- Development, efficacy testing of neurobehavioral, social-behavioral, and cognitive interventions for persons with disabilities and their caregivers—controlled trials
- Health and healthcare disparities for persons of ethnically and culturally diverse backgrounds with disabilities
- Aligned with “precision medicine” initiative—moderators and mediators (i.e. sex-based factors) of post-TBI, SCI, stroke, and other injury/illness outcomes
- Develop and test measures of patient variables (i.e. pain perception, cognitive responses to pain, molecular markers) affecting response and adjustment to disability
- Contact: [jniemeier@uabmc.edu](mailto:jniemeier@uabmc.edu)

# Danielle Powell, M.D.

- Cardiometabolic disease and obesity in individuals with spinal cord injury
  - Predictors of obesity
  - Evaluation of dietary intake and basal metabolic rate
- Long term management issues of adults with spina bifida
- Contact: [daniellepowell@uabmc.edu](mailto:daniellepowell@uabmc.edu)

# Jereme Wilroy, PhD

- Piloting an e-learning intervention in the clinic for improving behaviors associated with physical activity (i.e. goal-setting) among people with spinal cord injury.
- Exercise adherence to a 48-week home-based exercise program for people with mobility disability.

Contact Info:

[jwilroy@uabmc.edu](mailto:jwilroy@uabmc.edu)

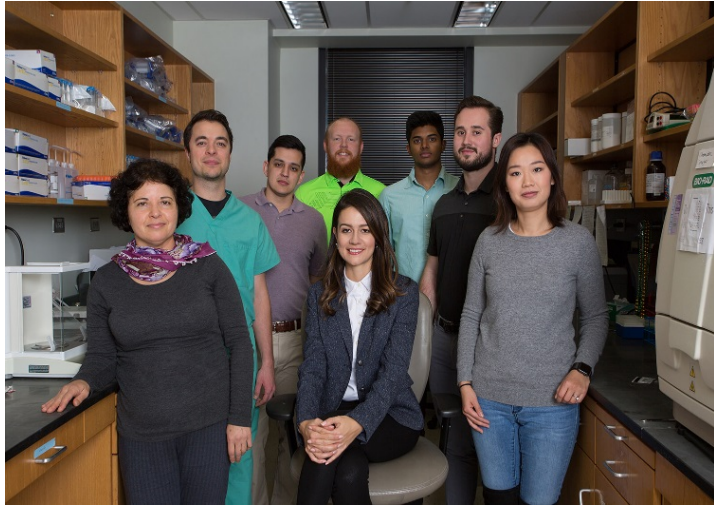
(205) 934-4508

**SUPER**  **HEALTH**

SCALE UP: PROJECT EVALUATING RESPONSIVENESS TO HOME EXERCISE AND LIFESTYLE TELE-HEALTH

**SCI**  **e-STORIES**  
discover why - learn how - overcome barriers - empower others

# Ceren Yarar-Fisher PT, PhD



Eunice Kennedy Shriver  
National Institute of  
Child Health and  
Human Development



## Current focus in the lab:

- the mechanisms by which skeletal muscle adaptation influences the risk of developing metabolic disorders in individuals with SCI;
- the molecular mechanisms by which neuromuscular electrical stimulation intervention influences metabolic and hypertrophic adaptations in the paralyzed muscle;
- the molecular mechanisms by which early utilization of ketogenic diet influences neuro-recovery and metabolism in patients with acute and sub-acute spinal cord injury.

## The laboratory has 3 active federally funded clinical research trials:

1. Targeting skeletal muscle to improve metabolic health in spinal cord injury (NIH)
2. Utilizing low carbohydrate/high protein diet to improve metabolic health in individuals with chronic spinal cord injury (NIDILRR)
3. Evaluation of ketogenic diet for improving neurorecovery in acute spinal cord injury (NIH)

*Trainee can choose to have patient interaction or work on existing data sets*

Contact [cyarar@uab.edu](mailto:cyarar@uab.edu)

# Xiaohua Zhou, M.D.

- Adherence to dysphagia restrictions after Stroke discharge: Some dysphagic patients show aspiration on formal swallowing evaluation, do not complain about recommended diet, never have aspiration pneumonia. What are best dysphagia recommendations for discharged patients?
- DVT risk and prophylaxis for SCI patients who will have flap surgery: Do they have similar risk as general population? This may need coordination with plastic surgery.

# Xiaohua Zhou, M.D.

- Bladder training on stroke patients. Currently protocol is the same as for SCI patients. Apparently bladder issues are different with stroke patient from SCI.
- Social issue with Stroke patient:
  1. Marital stability related to age of patient?
  2. Employment after Stroke?

Contact: [xzhou@uabmc.edu](mailto:xzhou@uabmc.edu)

# For questions

- Contact Dr Mark, FNR coordinator:

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*vmark@uabmc.edu*

- Sarah Banasiewicz, office assistant to Dr Mark  
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