

Undergraduate Summer Research Award (USRA) Program 2018

Dan Simon
Associate VP for Research

Introduction:
May 30, 2018
June 7, 2018



Office of
Research

USRA 2018

- 55 projects
 - College of Engineering
 - College of Liberal Arts and Social Sciences
 - College of Sciences and Health Professions
 - College of Urban Affairs
 - College of Education and Human Services
 - College of Business
- 77 CSU students, 22 NSF REU students from across the US
- 73 faculty

USRA 2018

- Sign-in! (Under your primary advisor's name)
- You will be paid for your time at each seminar
- Lunch is included!
- Each seminar is offered twice – choose only one!

USRA 2018

- **Picnic!** Tuesday, June 5, 12:00 – meat and veggie burgers – Euclid Commons
- **Seminar #1: Research and scholarship at CSU – Dr. Dan Simon**
Wednesday, May 30, 12:30, WH 403 or Thursday, June 7, 11:30, WH 405
- **Seminar #2: Research and scholarship integrity – Dr. Allyson Robichaud**
Wednesday, June 13, 12:30, WH 403 or Thursday, June 21, 11:30, WH 405
- **Seminar #3: Graduate school application workshop – Dr. Jason Halloran**
Wednesday, June 27, 12:30, WH 403 or Thursday, July 5, 11:30, WH 405
- **Seminar #4: How to do great research and scholarship – Dr. Elizabeth Gony**
Wednesday, July 11, 12:30, WH 403 or Thursday, July 19, 11:30, WH 405
- **Seminar #5: How to prepare a great research poster – Dr. Jacqueline Jenkins**
Wednesday, July 25, 12:30, WH 403 or Thursday, August 2, 11:30, WH 405
- **Seminar #6: How to give a great research talk – Dr. Shelley Rose**
Wednesday, August 8, 12:30, WH 403 or Thursday, August 9, 11:30, WH 405

USRA 2018

- USRA Poster Session, Thursday, September 6, 11:00 - 2:00



USRA 2018

- You are now a professional scholar!
 - Communicate with your advisor
 - Work hard
 - Show up on time
 - Accept criticism
 - Cooperate with others
 - Invest in your research

USRA 2018

- Dr. Katie Clonan-Roy, College of Education and Human Services
- Dr. Eric Schearer, College of Engineering
- Dr. Aaron Severson, College of Sciences and Health Professions
- Dr. Tracy Porter, College of Business
- Dr. Geyou Ao, College of Engineering

Katie Clonan-Roy, Ph.D.

Assistant Professor

**Department of Curriculum
and Foundations**

**College of Education and
Human Services**

k.clonanroy@csuohio.edu



Education: An Interdisciplinary Field

Administration, Organization and Leadership	Curriculum Studies
Learning and Instruction	Measurement and Research Methodology
Counseling and Human Development	History and Historiography
Social Context of Education	Research, Evaluation and Assessment in Schools
Education in the Professions	Postsecondary Education
Teaching and Teacher Education	Education Policy and Politics

Undergraduate Research at Ohio State University

- Research questions:
 - What are the experiences of women in the E.Z.L.N.?
 - How do women advocate for educational equity in their communities?
- Methods:
 - Secondary analysis of texts
 - Ethnographic research in Chiapas, Mexico
- Lessons:
 - Seeing the value in qualitative research and listening to untold stories.



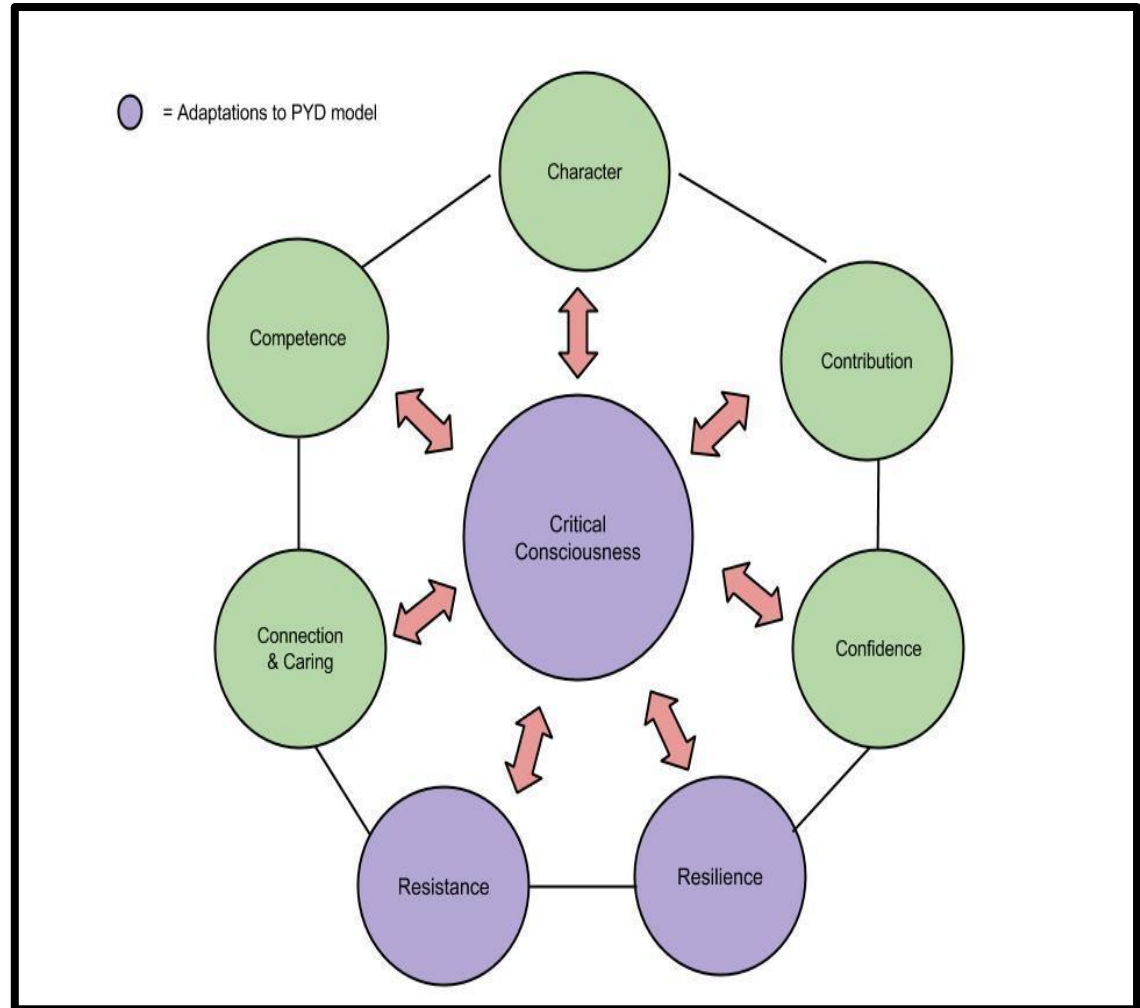
Dissertation Research at the University of Pennsylvania

- **Research question:**
 - What roles do Latina middle school girls' social, emotional and sexual experiences play in their identity development and experiences as students in the New Latino Diaspora?
- **Methods:**
 - Participatory ethnographic research
 - Social media research
- The girls' social, emotional and sexual experiences intersected to shape their personal and academic trajectories, how they understood themselves and how others understood them, and their mental health.



Research on Adolescent Development at the University of Pennsylvania

- Using findings from my dissertation research, I created a model of positive youth development specific to girls of color.
- Our model (Clonan-Roy, Jacobs, & Nakkula, 2016) was an adaptation of the positive youth development model (Lerner, et al., 2005).



Research on Critical Literacy at *Girls With Voices*

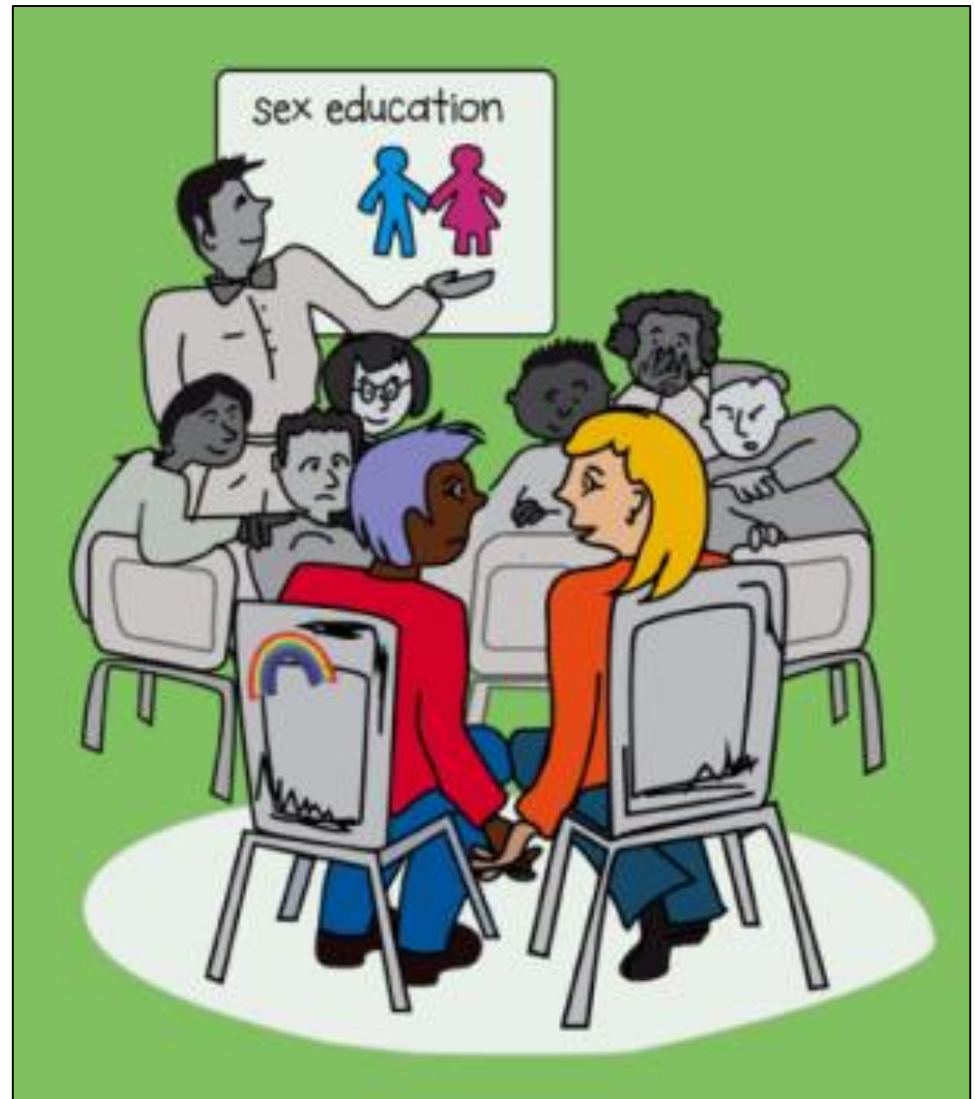
- **Research question:**
 - How does *Girls' With Voices* shape participants' literacy growth and critical literacy development?
- **Methods:**
 - Participant observation
 - Interviews
 - Surveys
 - Analysis of girls' writing / blogging



SO NOBODY ELSE

Research on Sexual Health Information Access for Sexual and Gender Minority Youth

- Interdisciplinary research with faculty members in Psychology and Social Work
- Research Questions:
 - Where are gender minority adolescents getting sexual health information from?
 - How does where youth get information facilitate sexual behaviors?
- Methods:
 - Surveys
 - Focus groups
 - Social media research



Dr. Eric Schearer

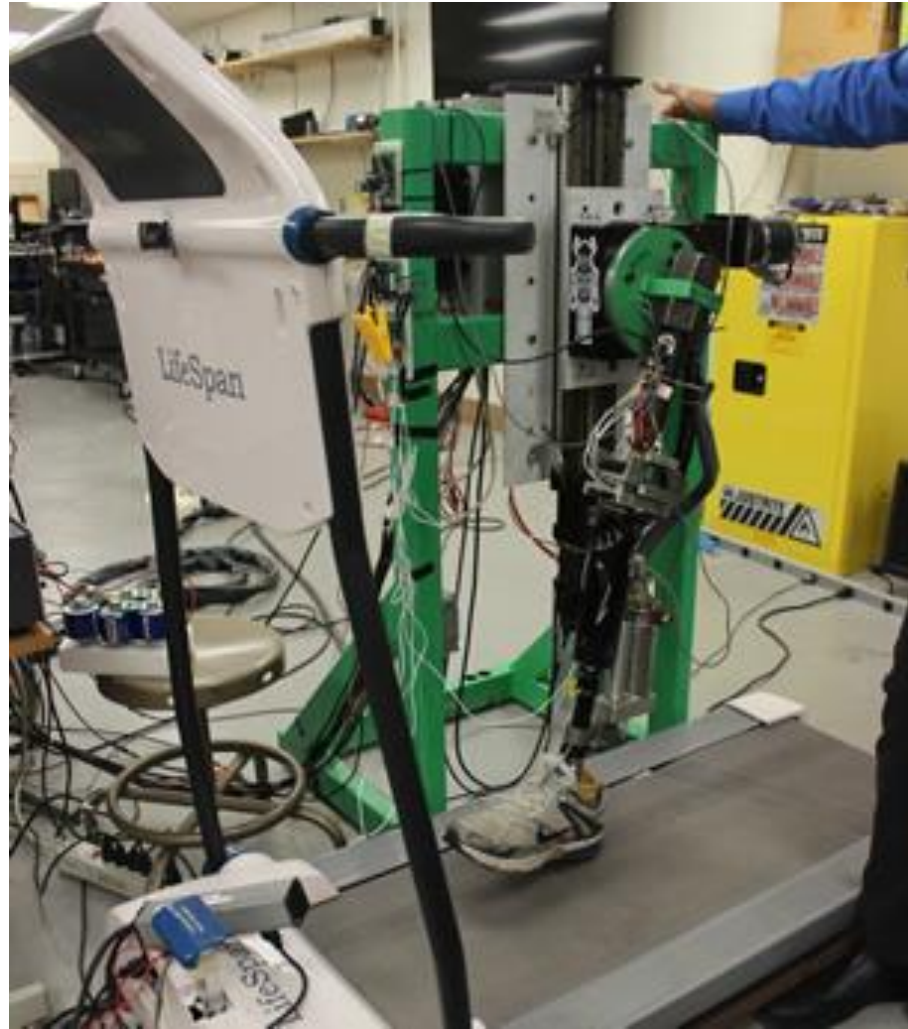


National Science Foundation (NSF)
Faculty Early Career Development Program:
The highest recognition NSF gives to early-career faculty

Human-Machine Systems Research at CSU

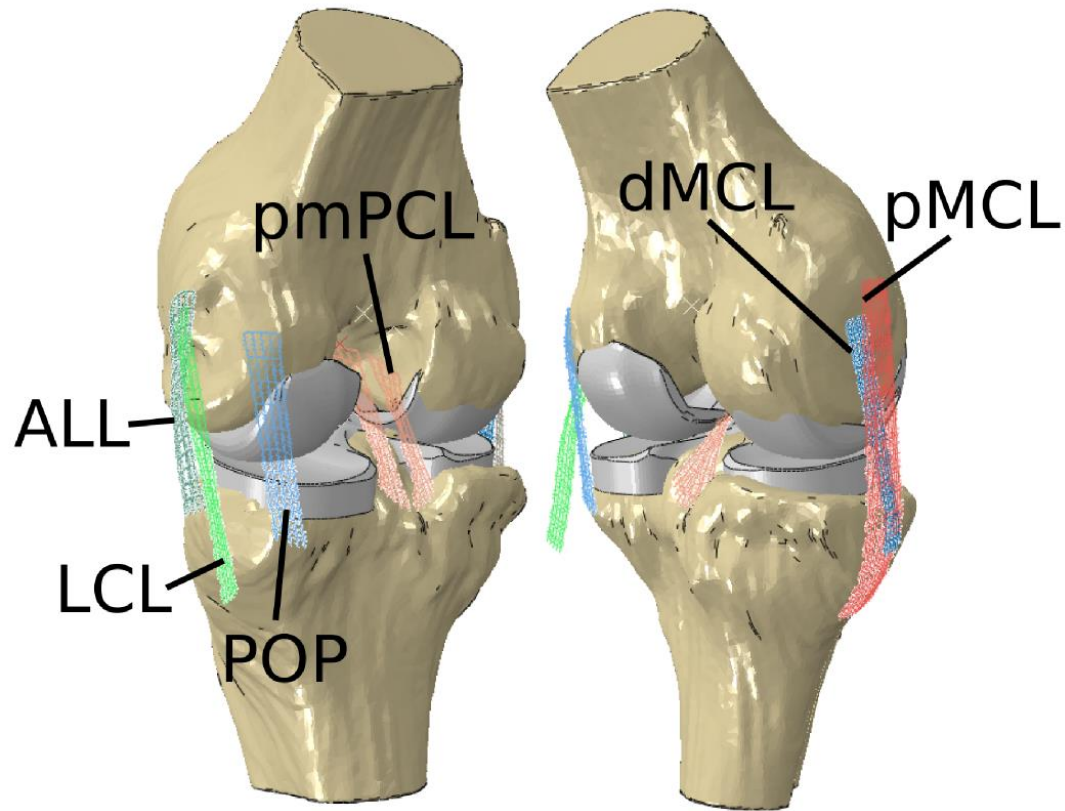
Prosthetic Legs

Dan Simon



Knee Mechanics

Jason Halloran



Smart Exercise Machines

Hanz Richter



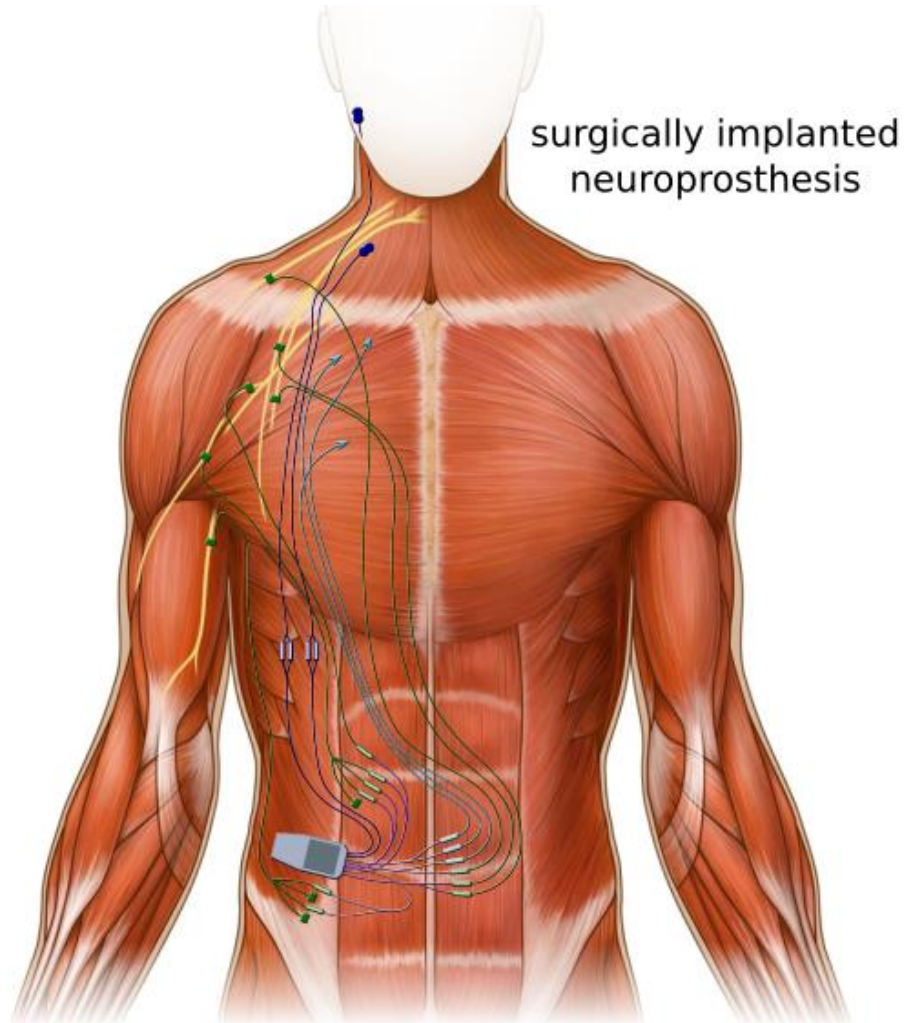
Gait Studies

Antonie van den Bogert



Functional Electrical Stimulation

Eric Schearer

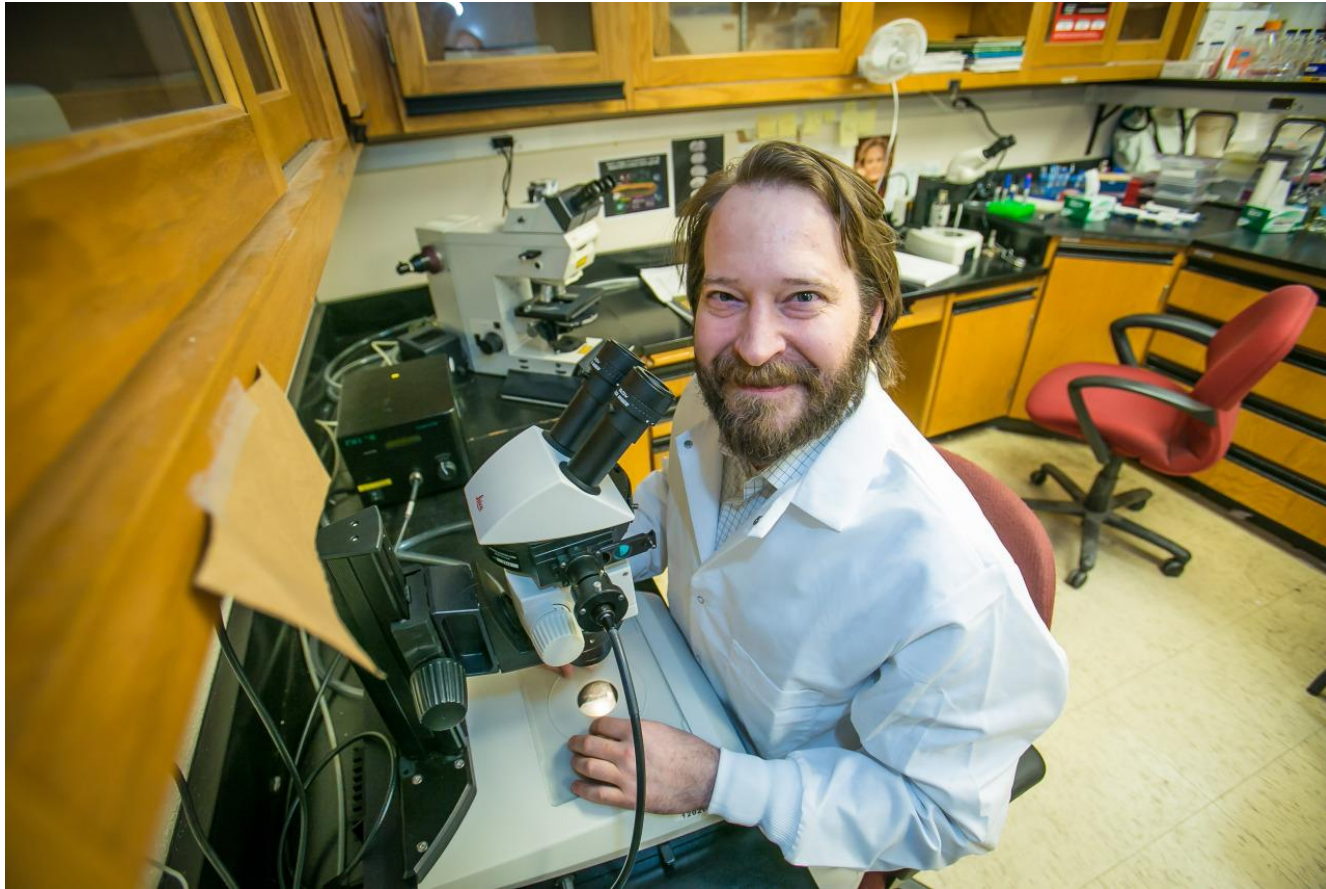


Balance Training

Ann Reinthal and Debbie Espy

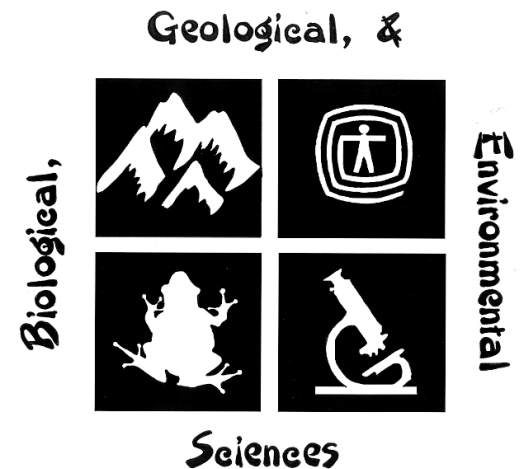


Dr. Aaron Severson



Dr. Aaron F. Severson

*Understanding the biology of chromosomal inheritance
during sexual reproduction*



Department of Biological, Geological, and Environmental Sciences
Center for Gene Regulation in Health and Disease (**GRHD**)
College of Sciences and Health Professions

CLEVELAND STATE UNIVERSITY

Gene Regulation in Health and Disease (GRHD)

Research focus

The Center focuses on understanding biological processes and how malfunction of these processes causes disease

Aging (and age related diseases)

Cancer

Cardiovascular disease

Blood coagulation disorders

Infectious diseases

Reproductive disorders (birth defects)

Gene Regulation in Health and Disease (GRHD) Research Center of Excellence at CSU

**Named Center of Excellence at CSU by the Ohio Department of
Higher Education in 2010**

**Currently brings together 15 full-time faculty from 3 departments:
BIO – 9 faculty; CHEM – 5 faculty; PHYS – 1 faculty
and ~100 lab researchers (post-docs, technicians, graduate and
undergraduate students, who work in GRHD labs)**

Funding, 2008-2016:

**>\$28,000,000 in grants from NIH, NSF, AHA, DoD, March of Dimes
>\$3,500,000 in private donations**



Gene Regulation in Health and Disease (GRHD)

15 faculty & ~100 students



Shared research interests in GRHD encourage collaborative research endeavors

Chromosomal biology:

G. Valentin Boerner

Tony Berdis

Hee-Sook Kim

Bibo Li

Aaron Severson

Cancer:

Tony Berdis

Girish Shukla

Bin Su

Michael Kalifatis

Aimin Zhou

DNA→RNA→Protein:

Anton Komar

Barsanjit Mazumder

Girish Shukla

Crystal Weyman

Signal transduction:

G. Valentin Boerner

Roman Kondratov

Andy Resnick

Crystal Weyman

Cardiovascular disease:

Michael Kalifatis

Barsanjit Mazumder

Xue-Long Sun

Crystal Weyman

Aimin Zhou

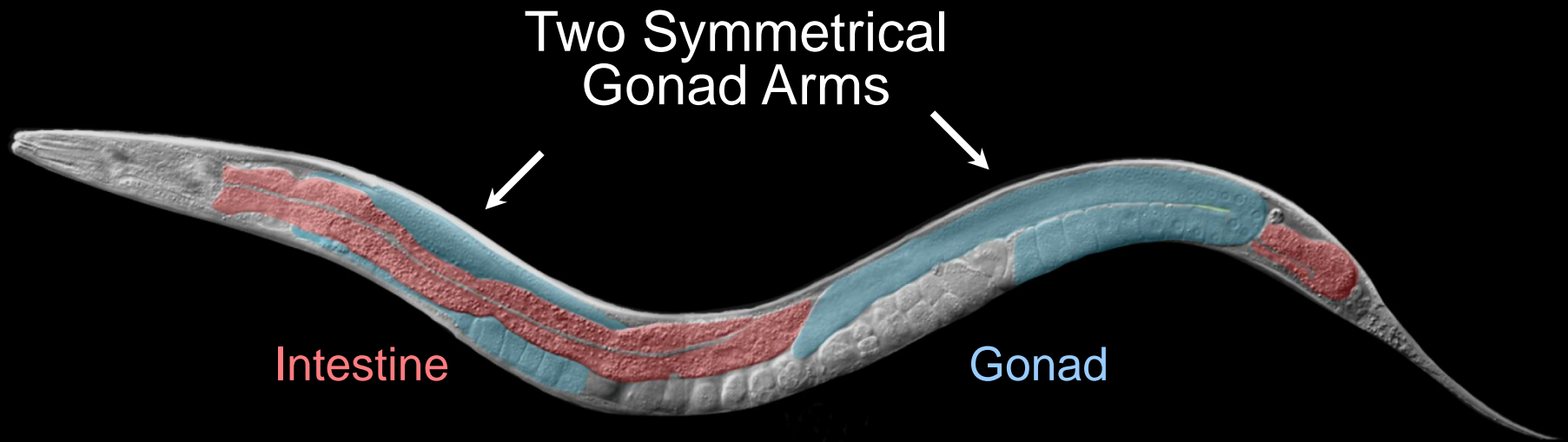
The Severson Lab



Studying reproductive health in
Caenorhabditis elegans

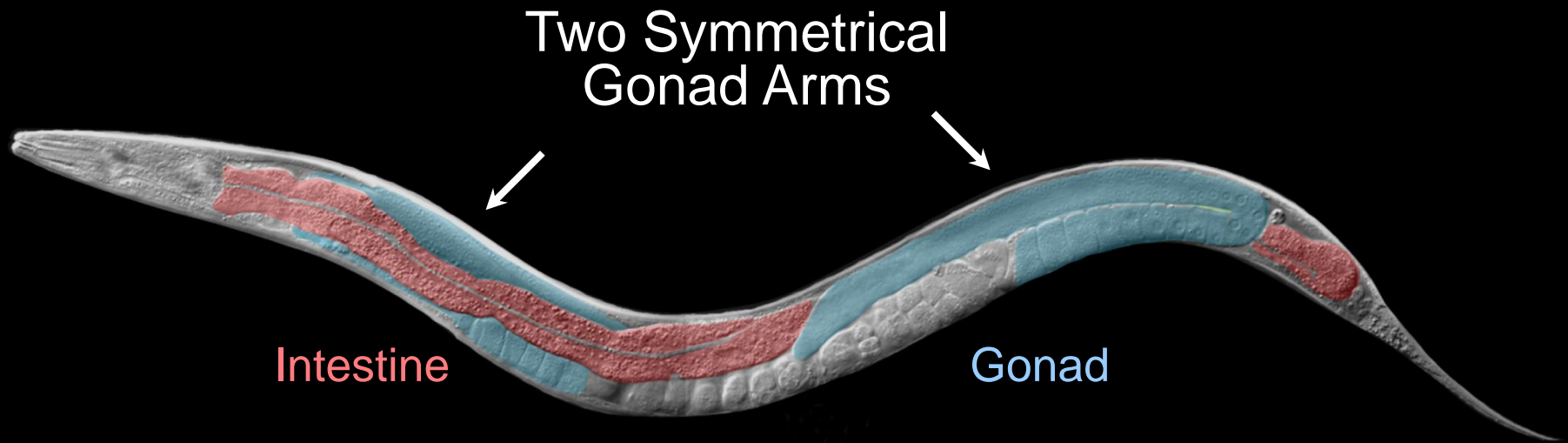
MEIOSIS: the process that forms gametes (sperm and eggs)

C. elegans: ideal for studies of meiosis



The *C. elegans* gonad occupies $\sim 1/2$ of the volume of the transparent adult hermaphrodite

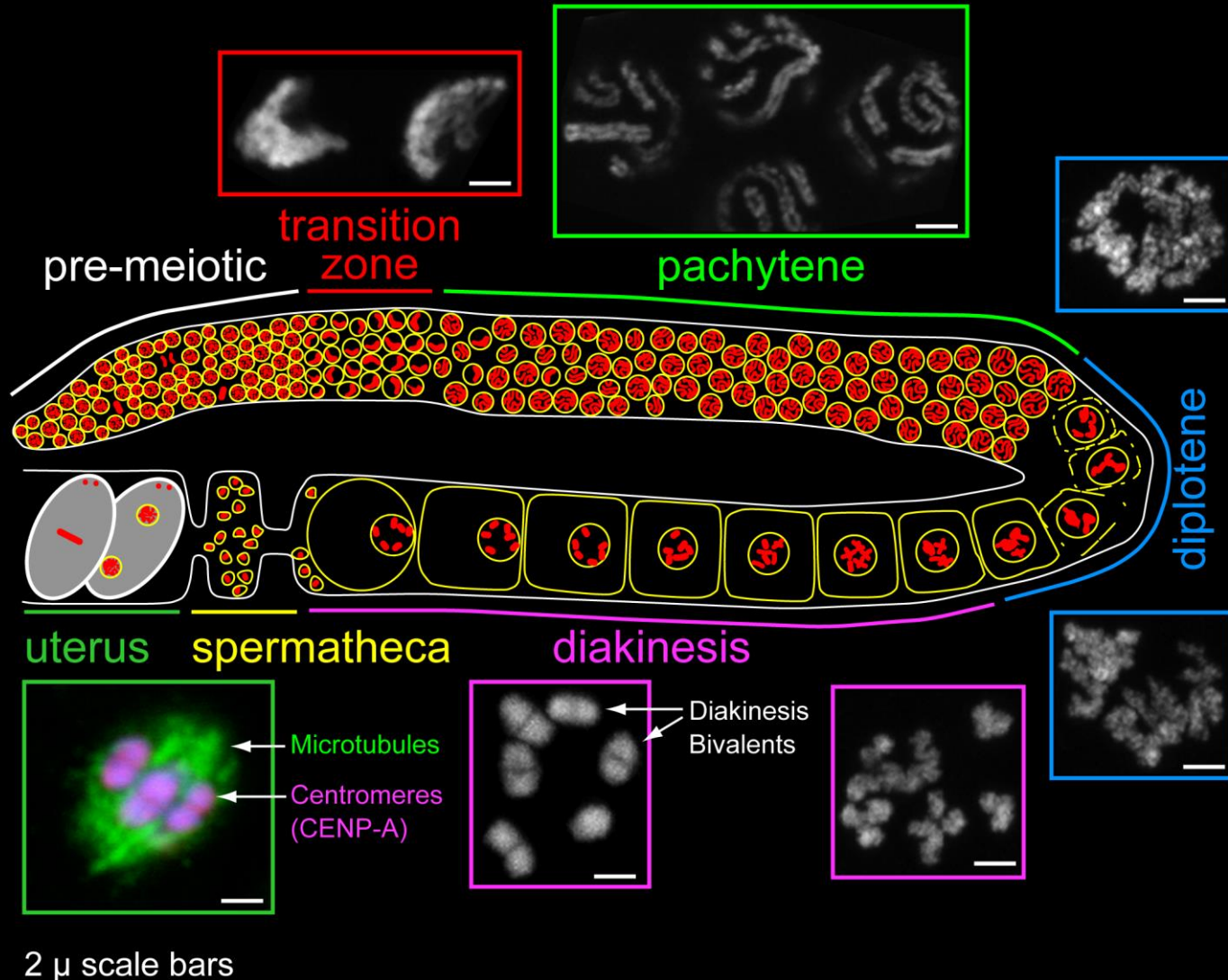
C. elegans: ideal for studies of meiosis



C. elegans is a great system for:

- Cytological studies (microscopy)
- Genetic screens (find mutants)
- Biochemical approaches (protein-protein and protein-DNA interactions)

Chromosome shape changes dramatically during meiosis



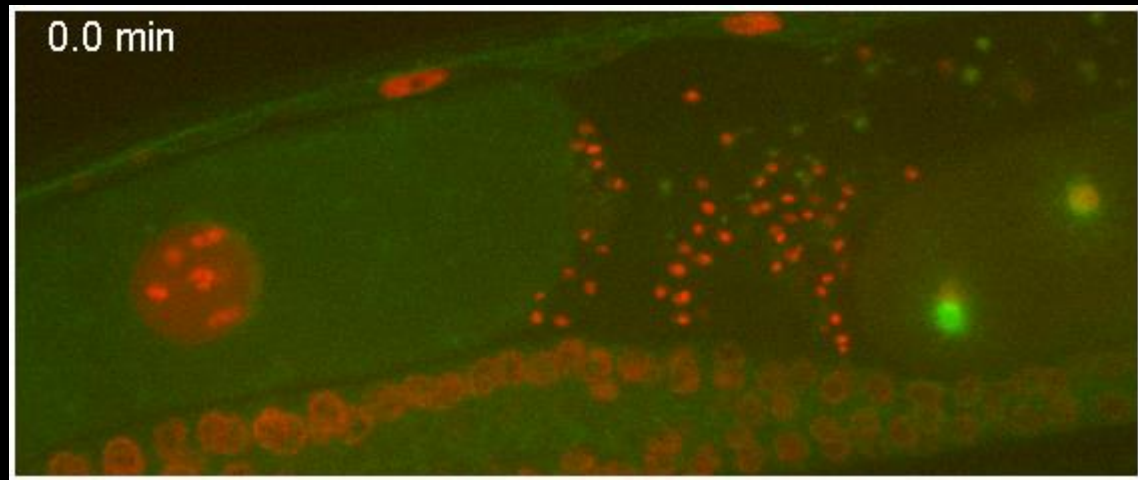
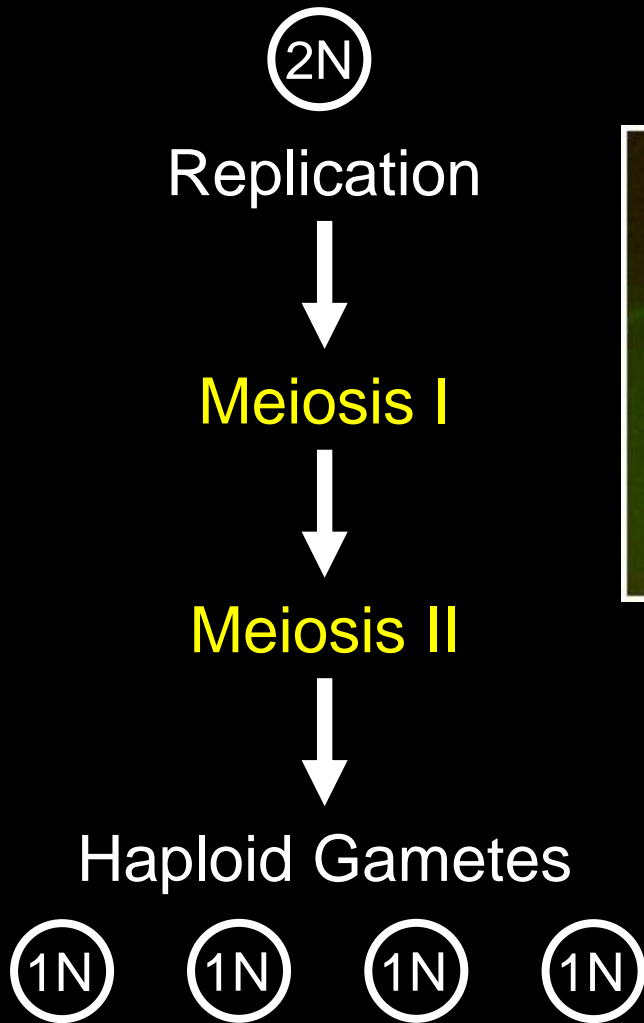
***C. elegans* has two sexes:
male and hermaphrodite**



A few hours later, a new baby is born!



Meiosis: one replication, two separations



Chromosomes

Microtubules

But why study meiosis in worms?

*The molecular mechanisms involved in *C. elegans* meiosis are very similar to those in humans!!*

Humans are very bad at meiosis



- >30% of fertilized eggs have abnormal chromosome number
- Monosomies and trisomies occur in over 5% of recognized pregnancies
- Meiotic defects are the leading known cause of spontaneous miscarriage and birth defects

Maternal age at conception is the best predictor of abnormal pregnancy

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Dr. Tracy Porter

Religion in the Workplace

- This has become highly taboo in organizations
 - Seen as proselytizing
 - Offensive
 - Too private for public conversation
- Connection between various religious perspectives (or no formal religion, agnostic, atheist)
- Organizations are actively seeking employees with strong values
 - Foundation of one's values (ethical behaviors)
- How do we allow employees to voice their religious, spiritual, or values and not offend?
 - Diversity and respect for differences



Wade Park Veterans Administration

- Human resource students working one-on-one with veterans looking to transition out of the VA
- Veterans have higher unemployment rates than the general population
 - Assumptions surrounding PTSD (media)
 - Transitioning military skills to civilian employment
- Previously they had one person who helped them develop a resume, apply for jobs, etc.
- Veteran challenges (physical, emotional, and legal)
- Surprising findings!
 - Broken stereotypes and assumptions
 - Increased self-efficacy
 - Future HR recruiters



Dr. Tracy Porter



Bullying in the Workplace

- Examples of Bullying
 - Locking new employees underground
 - Verbal abuse: Name calling, public embarrassment, yelling
 - Throwing objects at them: Chairs, pens, tools
- Why is this tolerated?
- What is the impact?
 - Turnover
 - Apathy
 - Low moral
 - Replicated behavior

Bio/Nano Hybrid Approach to Manipulate 1D Tubular Nanostructures



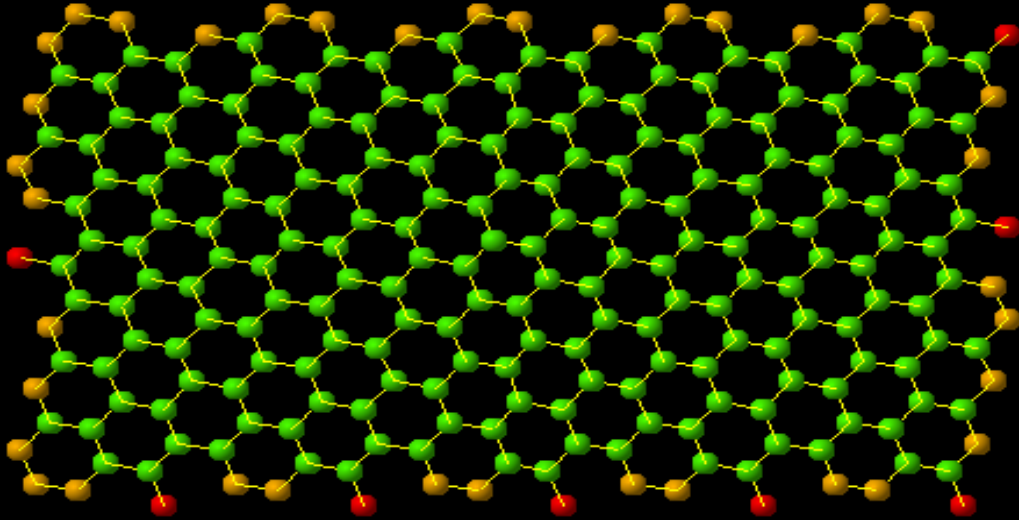
Geyou Ao, Ph.D.

Assistant Professor

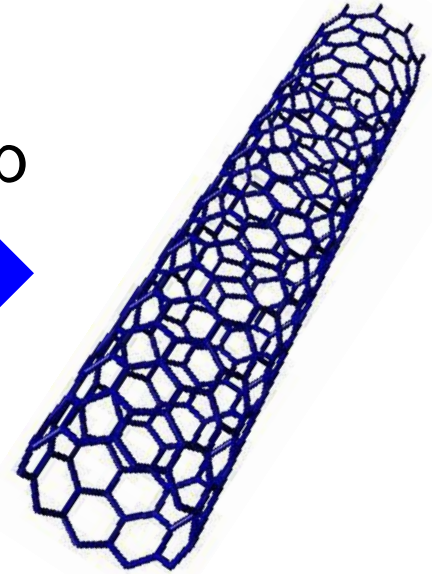
Department of Chemical and
Biomedical Engineering

Summer 2018

Single-Wall Carbon Nanotubes (SWCNTs)



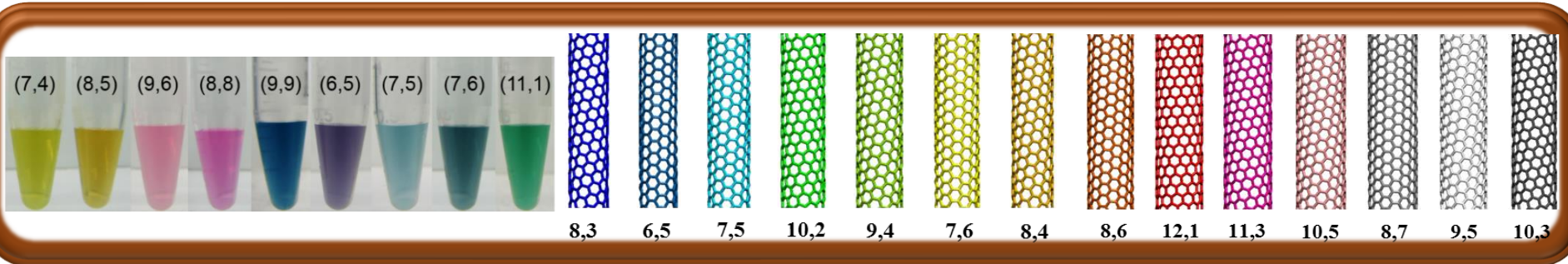
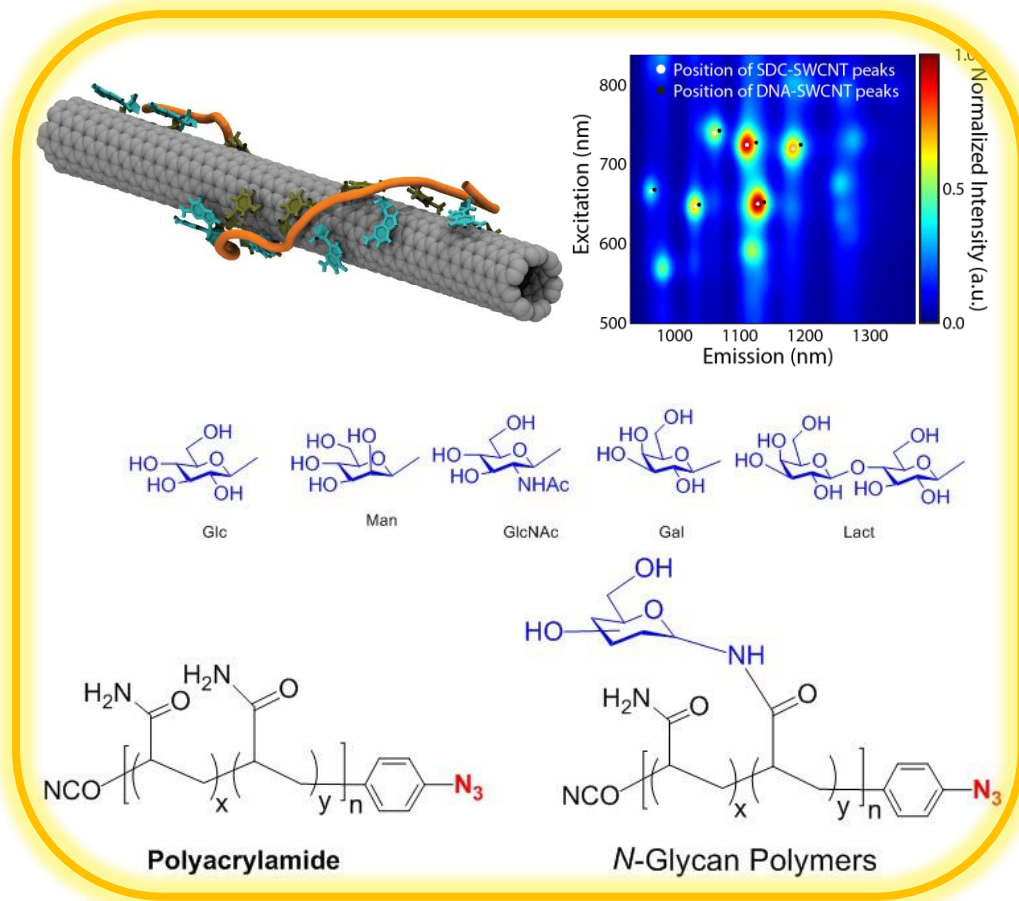
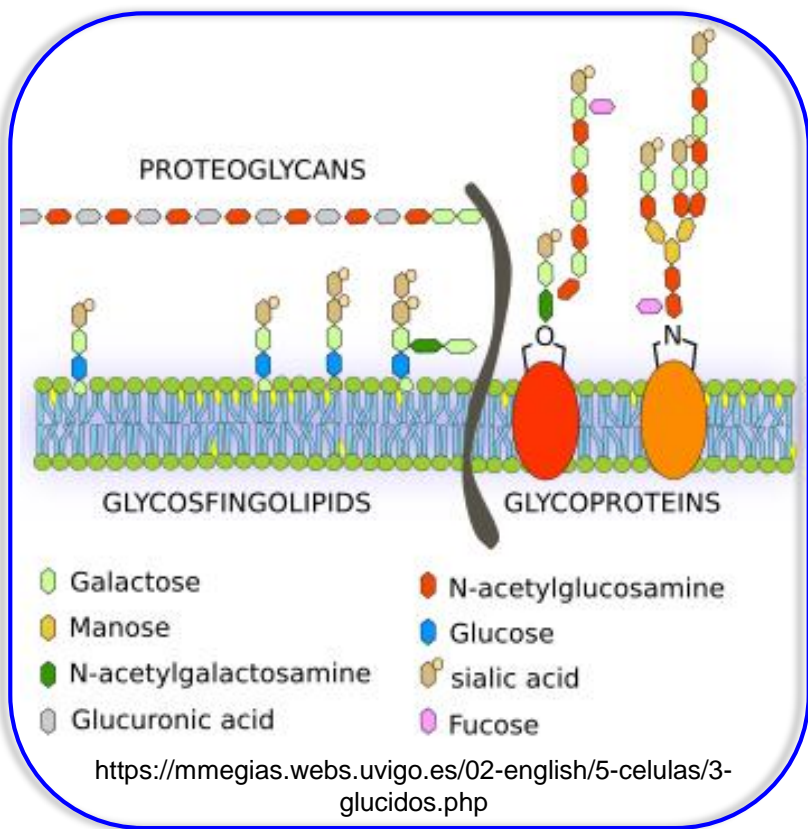
Roll up

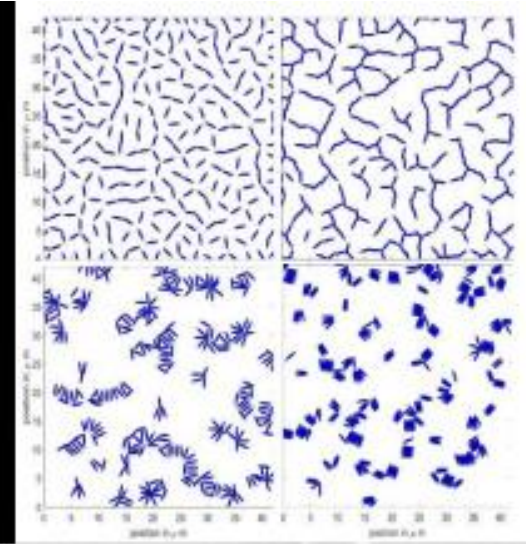
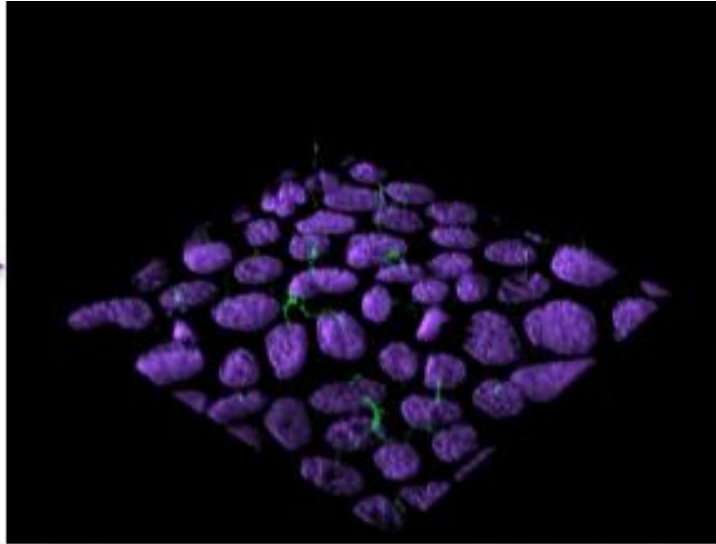
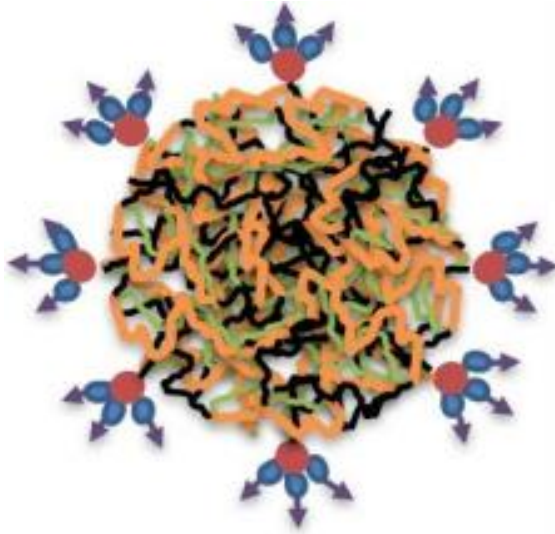


Physical and optical properties determined by chiral index (n, m)

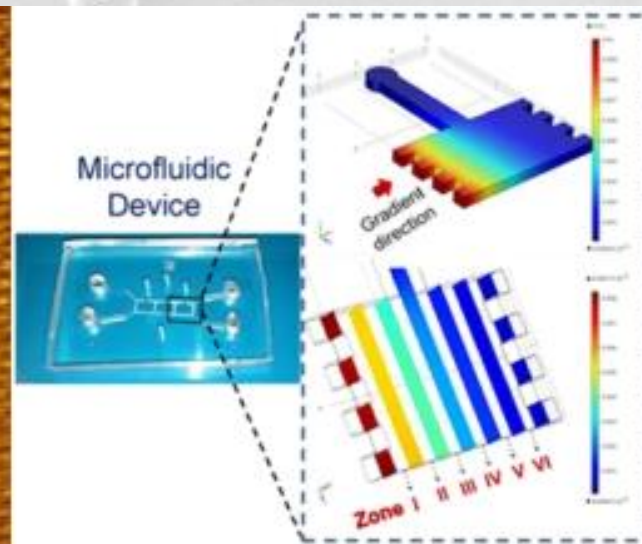
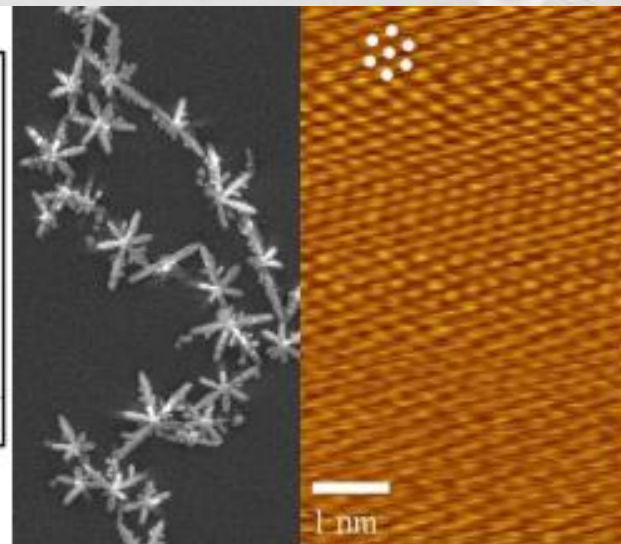
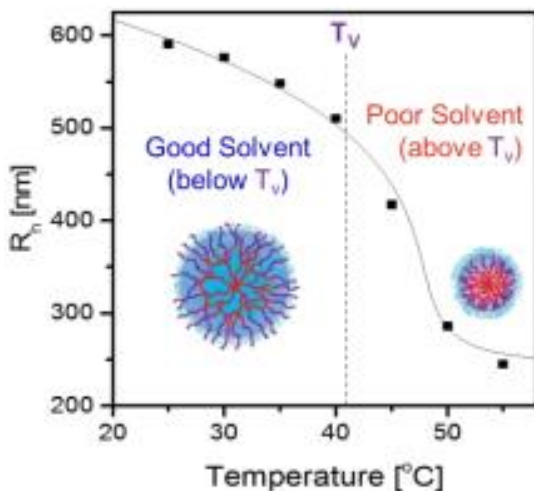
- Can be imagined by rolling graphene in a cylindrical fashion
- Diameter: ~ 1 nm
Length: 10 nm – 10 mm
→ Aspect ratios up to 100,000x

Glyco-SWCNT Conjugates





Summer 2018 NSF REU at CLEVELAND STATE UNIVERSITY: *Synthesis, Assembly, and Characterization of Soft Matter*



SOFT MATTER REU

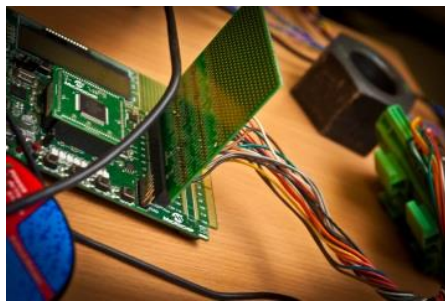


Research Experiences for Undergraduates:

SYNTHESIS, ASSEMBLY AND CHARACTERIZATION OF SOFT MATTER



- Microfluidic channels and mixers
- Drug delivery nanoparticles
- Polypeptide bio-inks
- Enhancing electron imaging capabilities of soft matter systems
- Modeling fluid flow in low Reynolds number systems
- Studying volume phase transition of polymeric microgels
- Total internal reflection microscopy of anisotropic particles
- Structural control and macroscopic assembly of boron nitride nanotubes



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