CLEMSON UNIVERSITY

SCHOOL OF HEALTH RESEARCH

Information Exchange

February 9, 2017
3:00 - 4:30 PM
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<td>3:00 - 3:20</td>
<td>Welcome and Introductions</td>
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<td>Featured Health Research Collaboration: Marissa Shuffler, PhD</td>
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<td>New CU-GHS Embedded Scholars</td>
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<td>GHS Proceedings: Ally Hale</td>
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<td>3:20 - 3:30</td>
<td>CUSHR Updates</td>
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<td>Collaboration Opportunity Spotlight</td>
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<td></td>
<td>Kyle Jeray, MD</td>
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<td>Vice Chair for Academics, GHS Department of Orthopaedic Surgery</td>
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<td>John DesJardins, PhD</td>
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<td>Associate Professor, Bioengineering</td>
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<td>3:55 - 4:05</td>
<td>College Spotlight: Health Research in the College of Engineering, Computing and Applied Sciences</td>
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<td>Douglas Hirt, PhD</td>
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<td>Associate Dean for Research</td>
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<td>Marek Urban, PhD</td>
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<td>Professor, Materials Science and Engineering</td>
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<td>4:05 - 4:15</td>
<td>Announcements</td>
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<td>4:15 - 4:30</td>
<td>Collaboration Connections - Reception</td>
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Marissa Shuffler, PhD
Assistant Professor of Psychology
College of Behavioral, Social and Health Sciences
Faculty Scholar, CUSHR

Conscious Leadership Research
Greenville Health System
Conscious Leadership

Does any of this matter?

Does it impact meaningful outcomes?
If so, why and how? If not, how do we improve?
A Longitudinal, Mixed-Method Approach...

- On-going research
- To date, six key data sets plus opportunities to connect to other data

WE ARE HERE
Current & Future Work...

WHAT DO WE KNOW RIGHT NOW?

• Greater leader/manager participation in CL development activities is associated with higher levels of CL knowledge
• Higher CL knowledge, participation associated with higher unit commitment/engagement, leader fairness perceptions, leader-member relations
• Units where leaders were more engaged in CL efforts appeared to be less affected by major organizational changes (“buffering” effect)

WHAT DO WE STILL NEED TO EXPLORE?

• Identify individual factors/profiles that may predict:
  – Leadership development seeking/resistance
  – Leadership behavior adaption/enactment
  – How leadership may change the functioning of units/teams

• Development of behaviorally based measures of conscious leadership engagement, climate:
  – What are the behaviors that matter for healthcare leadership?
  – Analyzing of survey, focus group, interview data, leveraging of existing tools

• Study long(er) term effects:
  – How does leadership relate to actual patient satisfaction, safety?
  – What other team/unit outcomes should be evaluated over time?
  – Need to break down what matters when in terms of CL components

• Determine best ways to train/develop leadership:
  – Different for different levels/types of leaders?
  – Who really needs training/development, and how much?
  – Use of simulation tools for practice, feedback

BUT: How do we achieve all of this?
A Plan for Success...

• Clemson-GHS Leadership Working Group
  — Interdisciplinary network of collaborators to address different needs/issues
  — Workshop held in November 2016
  — Collaborators from UNC-Charlotte, Center for Creative Leadership, University of Central Florida, Hofstra University, UGA, CUNY, Johns Hopkins, VCU, and beyond...

• Student Involvement
  — 7 manuscripts under review or in press, 4 led by graduate students
  — 2 graduate, 1 undergraduate presenting this week at a conference
  — Creative Inquiry team involvement, including presentations by undergraduates
  — 20+ conference posters, panels, presentations, symposia, many led by students

• New Postdoctoral Fellow
  — Dr. Chelsea LeNoble, I/O Psychology
  — Joint CU-GHS funded effort to sponsor postdoctoral fellow
  — Responsible for tracking existing work, identifying emerging opportunities for data collection and developing innovative research projects in collaboration with GHS-CU goals

• Research Funding Efforts
  — Seed funding from GHS, Clemson has propelled our work forward
  — Pursuing potential opportunities with National Science Foundation, Robert Wood Johnson Foundation, AHRQ

• Integration with other CUSHR Faculty, Research Efforts
  — Exploring burnout, other occupational health concerns

Contact if interested! MSHUFFL@CLEMSON.EDU
CUSHR Update: Embedded Scholars

Chelsea LeNoble, PhD
Academy of Leadership

Christopher Wilson, PhD
Mathematics/Statistical Science

Susan O’Hara, PhD
Nursing and Architecture

Chelsea is a FIT graduate in Industrial & Organizational Psychology. At GHS she researches conscious leadership, evaluates training methods, and develops projects to increase team effectiveness.

Chris is a Clemson graduate whose doctoral work focused on statistics and data analysis. As a postdoctoral fellow he collaborates with faculty across many departments to construct, analyze, and report data for research.

As a practicing nurse and owner of O’Hara Healthcare Consultants, Susan works at GHS to optimize healthcare operations and patient management. She previously taught at Boston Architectural College.
About: Peer-reviewed medical journal, only accepts original unpublished research, *enthusiastically welcomes submissions from our academic partners!*

**Types of Articles:** Editorials, Original Research, Review Articles, Special Reports, or Case Reports/Series
Updates:

Fall: Clinical Faculty Appointments
22 new Clinical Faculty appointed in Fall 2016

Spring: Faculty Scholar Appointments
The call for 2017 Faculty Scholars has been released. Nominations and applications due by: Monday, February 27

TOTALS:
114 Faculty Scholar Appointments
50 Clinical Faculty Appointments

CUSHR Appointment Committee:
- Lawrence Fredendall, Chair
- Thomas Britt
- Susan Chapman
- John DesJardins
- Cheryl Dye
- Kevin Taaffe
- Margaret Ann Wetsel
- Windsor Sherrill
- Kerry Smith
CUSHR Update: Fall 2016 Clinical Faculty

GHS
Gary Abrams, MD
Matthew Bitner, MD, Med, FACEP
William Cobb, MD
Kacey Eichelberger, MD
David Forstein, DO, FACOOG (Dist.)
Jennifer Hudson, MD
Matthew Hudson, PhD, MPH
Zac Kahler, MD
Michael Kissenberth, MD
Bruce Lessey, MD, PhD
Phillip Mochella, MD, PhD
Estate Sokhadze, PhD
Peggy Wagner, PhD

MUSC
Kenneth Catchpole, MD
Michelle Woodbury, PhD, OTR/L

GGC
Chin-Fu Chen, PhD
Steven Skinner, MD
Anand Srivastava, PhD
Timothy Wood, PhD
CUSHR Update: Groundbreaking

Clemson University Center for Nursing, Health Innovation & Research

Groundbreaking

January 30, 2017

Greenville Memorial Campus
Upcoming Events

Clemson University Center for Human Genetics
Ribbon Cutting Ceremony
Wednesday, February 15, 2017; 2:00 – 4:00 PM
Greenwood Genetic Center
RSVP to Katie Campbell Smith at rsvp@clemson.edu or 864-656-0123

NIH: 2017 MARC U-STAR
Submission deadline: February 21, 2017
The Maximizing Access to Research Careers
Undergraduate Student Training in Academic Research
For more information:
https://www.clemson.edu/cuosp/detail/index.php?ppoI D=698

Bacterial Infections Collaboration Club
Jeffrey Anker
See Jeremy Tzeng to sign up!

Cardinal Health: 2017 Generation Rx Request for Proposals
Submission deadline: February 27, 2017
Best Practices in Pain Medication Use & Patient Engagement
For more information:

GHS Health Sciences Center Research Showcase
March 31, 2017; 12:00 PM – 2:00 PM
Poster Abstracts due by 5PM on March 1, 2017 to researchdiv@ghs.org

4th Annual Care Coordination Institute Symposium
April 23 – 25, 2017; Greenville, SC
Early bird registration until February 28!
https://www.eventbrite.com/e/2017-cci-symposium-tickets-27331207377
• Video
• 3:07

https://www.youtube.com/watch?v=0rzD-uAeUow
GHS-Clemson Collaboration Spotlight
Featured GHS Academic Vice Chair

Kyle Jeray, MD
Vice Chair for Academics
Department of Orthopaedic Surgery
Greenville Health System
Clinical Professor, CUSHR
GHS-Clemson Collaboration Spotlight

John DesJardins, PhD
Associate Professor of Bioengineering
College of Engineering, Computing and Applied Sciences
Faculty Scholar, CUSHR
Health Research
Clemson College Spotlight

Douglas Hirt, PhD
Associate Dean for Research
College of Engineering, Computing and Applied Sciences
CECAS Health-Related Research
CECAS Health-Related Research
CECAS Health-Related Research
Health Research
Clemson College Spotlight

Marek Urban, PhD
J.E. Sirrine Foundation Endowed Chair
Professor
Dept. of Materials Science and Engineering
College of Engineering, Computing and Applied Sciences
Faculty Scholar, CUSHR
Is an Infection a Disease?

Marek W. Urban, Ph.D.

Department of Materials Science and Engineering
and
Center for Optical Materials Science and Engineering (COMSET)
Clemson University

URBAN RESEARCH GROUP
www.clemson.edu/ces/urbanresearch
Polymer Nanoscience
- New Polymerization Approaches
- Shape/Size/Heterogeneity
- Hollow, Gibbous, Nano-Particles
- Nanotubes, Nanowires, Nanofibers

Self-Repairing Materials:
- Chemico-Physical Components Facilitating Repairs
- Electromagnetic Radiation Induced Healing
- Chemically Induced Self-Healing

BioActive Polymeric Surfaces/Interfaces:
- Antimicrobial/Anticoagulant/Antifouling (AAA)
- Surface Antibiotics
- Surface Bacteriophages

Encoding Stimuli-Responsiveness:
- Multi-Responsiveness at Nano-Scale
- Gear-Like Assemblies
- Cilia-Like Behavior
- Shape-Memory and Color

MATERIALS WITH COGNITIVE FUNCTIONS
Dynamic Responses at Multi-Scale Lengths
Polymers in Medicine

- Poly(ethylene) : PE/UHMWPE
- Poly(methyl methacrylate) : PMMA
- Poly(ethylene terephthalate) : PET
- Poly(tetrafluoroethylene) : PTFE
- Poly(propylene) : PP
- Poly(2-hydroxyethyl methacrylate)
- Poly(urethane) : PUR
- Poly(lactic acid) : PLA
- Poly(caprolactone) : PCL
- Polypyrrole : PPy
- Poly(ethylene glycol) : PEG

Why Modify Polymer Surfaces?

- Adhesion
- Wettability
- Biocompatibility

**Desired Biocompatibility**

- Antimicrobial
- Anticoagulant
- Antifouling

Each year, ~2 million infections are acquired in hospitals; ~100,000 of which are fatal

Infections add $5 billion to cost of health care

The best approach is prevention

Antimicrobial Surfaces

Antimicrobial Agents

• Metals
  \( \text{Ag}^+, \text{Sn}, \text{Hg} \)

• Quaternary ammonium

• Antibiotics

• Chitosan

Ampicillin Attached to PE and PP against *S. aureus* (CFU/cm²)

![Graph showing CFU/cm² against different treatments: PE/PP, P-MA, P-MA-PPA, P-MA-PPA-AMP.](image)

How Many 500 mg Pills of AMP Will It Takes to Cover a Football Field?


Phage-Bacterium War on Polymeric Surfaces; Can Surface-Anchored Bacteriophages Eliminate Microbial Growth?

Attachment of T1 and Φ11 Phages on Polymeric Surfaces

<table>
<thead>
<tr>
<th></th>
<th>T1 Phage&lt;sup&gt;a&lt;/sup&gt;</th>
<th>T1 Phage&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Φ11 Phage&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Φ11 Phage&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean #/μm&lt;sup&gt;2&lt;/sup&gt;</td>
<td>5.76</td>
<td>15.80</td>
<td>10.84</td>
<td>9.00</td>
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<tr>
<td>Standard Deviation</td>
<td>1.68</td>
<td>7.03</td>
<td>1.01</td>
<td>1.41</td>
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<sup>a</sup> Image quantification of phages from AFM images
<sup>b</sup> Manual quantification of phages from AFM images

FTIR spectra showing wavenumbers in cm<sup>-1</sup>: 1705 (C=O), 1544 (Amide II), 1653 (Amide I)
Attachment of T1 and Φ11 Phages on Polymeric Surfaces
Antimicrobial Activity of T1 and Φ11 Phages on Model Si Surfaces

Si-MA-T1 phage (E. coli)  Si-MA-Φ11 phage (S. aureus)

Si against E. coli  Si-MA against E. coli  Si against S. aureus  Si-MA against S. aureus
• **Challenges and Opportunities:**
  
  – Dynamic Stimuli-Responsive Polymeric Surfaces
  
  – Vertical and Horizontal Responsiveness
  
  – Antibiotics vs Macrophages
  
  – Multi-Facet Applications
    
    • Antimicrobial, Anticoagulant, Antifouling (AAA)
    
    • Recognition Surfaces
    
    • Photochromic Surfaces
  
  • Acknowledgements
    
    – NIH (?)
    
    – NSF
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