CARD and Drug Discovery/Development at OU Norman

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Assistant Professor, Chemistry
CARD Bioscience Faculty Fellow

1st OU-OUHSC Biomedical Engineering Symposium
March 24, 2017
University Strategic Initiatives

Aspire 2020
A Decadal Roadmap for OU Scholarship

- Competitiveness
- Engagement
- Culture
R&D Focused Goals from Aspire 2020

- **Goal #1:** Broaden the opportunity space for support of faculty scholarship and mitigate against unexpected fluctuations in external funding sources.

- **Goal #2:** Encourage and incentivize the pursuit of transformative ideas, the scaling up of ideas, and the development of external linkages with renowned individuals and organizations nationally and globally.

- **Goal #7:** Develop new research linkages with the private sector that bring opportunities for faculty and students, and that promote the transformation of scholarly outcomes into demonstrable values for society.
Center for Applied Research & Development

- Office of VPR

- Designed to support and enable collaboration between industry, federal, and state mission agencies and OU researchers on projects that fall within the applied research and development areas

- Director: James L. Grimsely

- Key component of OU’s Aspire 2020
  - Improving OU’s engagement in areas of research where, traditionally, there has been less participation

- Intended to move OU into new areas of applied R&D without sacrificing the tenets of inquiry driven R&D – the hallmark of academia
Federal Spending as a Percent of GDP, 1962 - 2021

Source: Budget of the U.S. Government FY 2017. © 2016 AAAS
Motivation

Norman Campus Research Expenditures by Source, FY 2007 - 2016

Source: OU Financial Support Services
Norman Campus Expenditures Direct from Defense Department Agencies,
FY 2007 - 2016
Excluding Amounts Passed Through Other Sponsors

Defense, Security,
And Defense Initiative
(DSI)

2013 Sequestration...

Source: OU Financial Support Services

Office of the Vice President for Research
Motivation
Adam S. Duerfeldt, Ph.D.

- OU Assistant Professor – Chemistry

- Research Profile: Medicinal Chemistry
  - Drug Discovery & Development
    - Antibacterial
    - Diabetic Retinopathy
    - Anticancer

Website: DuerfeldtLabs.com | Social Media: @DuerfeldtLabs

- Relevant Experience
  - IAMI Graduate Fellow
  - Scientific Advisor – Tech Coast Angels (San Diego, CA)
  - Scientific liaison for NVD and Price College of Business
Expand the bioscience applied research portfolio through the enhancement of mutually beneficial research relationships and faculty awareness.
Objectives

• **More effective alignment** between OU’s R&D portfolio and that of the Federal government, going well beyond agencies for which OU has traditionally received the bulk of its funding (e.g., NSF, NIH)

• **Enhance collaboration** between industry, federal, and state mission agencies on applied research projects

• **Educate** and inform faculty about public-private opportunities

• Educate faculty about applied research funding mechanisms and **increase the number of applications** to these mechanisms

• **Build the local workforce** through the training of student and postdocs

• **Address barriers** to collaborative research (i.e., IP, time expectations, etc.)
facilitate | fəˈsiliˌtāt |

verb [ trans. ]
to make (an action or process) easy or easier

Webster’s New World College Dictionary
• Institute of Natural Products Applications and Research Technologies

• Focus: collaborative development of drug leads from natural sources

Component Labs
• Robert H. Cichewicz, Director and PI
• Anthony W.G. Burgett, PI
• Sisi Wu, PI
• Shanteri Singh, PI
• Indrajeet Sharma, PI
• Adam S. Duerfeldt, PI
Robert H. Cichewicz, Ph.D.

- INPART founder and director
- Identification of compounds produced by fungi and bacteria that can be used as leads to treat disease
- Exploration of new microbial environments
- Novel approaches to natural product isolation

Email: rhcichewicz@ou.edu
Website: npdg.ou.edu
Anthony W.G. Burgett, Ph.D.

- Assistant Professor, 2013
- Target identification
- Mechanism of action identification
- Natural Product total synthesis
- Molecular biology, protein biochemistry, and cellular biology

Email: anthony.burgett@ou.edu
Sisi Wu, Ph.D.

- Assistant Professor, 2014
- Top-Down Proteomics: analysis of intact protein samples by mass spec
- Interest #1: Fungal secretome analysis
- Interest #2: Histone code deciphering

Email: si.wu@ou.edu
Shanteri Singh, Ph.D.

- Assistant Professor, 2015
- Interest #1: Characterization of new enzymes from biosynthetic pathways
- Interest #2: Improve biocatalysis through enzyme engineering

Email: shanteri.singh@ou.edu
Indrajeet Sharma, Ph.D.

- Assistant Professor, 2014
- Interest #1: Natural product diversification and total synthesis
- Interest #2: synthetic method development

Email: isharma@ou.edu
Website: indrajeetsharma.com
Adam S. Duerfeldt, Ph.D.

- Assistant Professor, 2014
- Interest #1: Pathway/enzyme activation as an antibacterial strategy
- Interest #2: Small molecule treatments for diabetic retinopathy
- Interest #3: Synthesis of natural product “bio-cores”

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Faculty Strengths

Chemistry & Biochemistry Faculty Expertise

• Natural Product Drug Discovery (INPART)
• Antibacterial Development
• Anticancer Approaches
• **Single Cell Mass Spectrometry**
• Proteomics and Enzyme Modification
• **Structural Biology (OCSB COBRE)**
• Microfluidics
• Nanotechnology / Nanomedicine

Research Cores – OU Norman

• Macromolecular Crystallography Lab (MCL)
• Small Molecule Crystallography
• Protein Production Core (PPC)
• Center for Bioanalysis (CBA)
• NMR Facility
• Mass Spec Facility
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