

COLLEGE OF SCIENCE

DEAN: DR. ANDREA L. EASTER-PILCHER

- ▶ Seven departments: Botany, Chemistry & Biochemistry, Earth & Environmental Sciences, Mathematics, Microbiology, Physics, Zoology and the Developmental Mathematics Program.
- ▶ 1200 undergraduate students
- ▶ 77 tenured and tenure-track faculty members and several instructors
- ▶ Exceptional faculty
 - ▶ Writing successful research and teaching grants
 - ▶ Actively engaged in undergraduate research and service
 - ▶ Dedicated to the success of their students during their time here at WSU and in their lives beyond WSU



Additional Programs Across the CoS

- ▶ Pre-professional programs:
 - ▶ Pre-medical (Microbiology, Zoology, Chemistry)
 - ▶ Pre-dental (Microbiology, Zoology, Chemistry)
 - ▶ Pre-veterinary (Zoology)
 - ▶ Pre-pharmacy (Chemistry, Microbiology)
- ▶ Developmental Math Program
 - ▶ Director and approximately 40 adjunct and instructor level faculty
- ▶ Minors



STRATEGIC PLANNING IN THE COLLEGE OF SCIENCE

- ▶ Faculty one-on-one sessions with the dean
 - ▶ Four specific questions:
 - ▶ WHAT ARE YOUR ASPIRATIONS/GOALS FOR YOUR DEPARTMENT?
 - ▶ WHAT ARE YOUR ASPIRATIONS/GOALS FOR THE COLLEGE OF SCIENCE?
 - ▶ HOW CAN WE EXPAND OUR FOOTPRINT LOCALLY, REGIONALLY AND BEYOND?
 - ▶ WHAT ARE THE STUMBLING BLOCKS THAT YOU RECOGNIZE THAT MIGHT PREVENT US FROM ACHIEVING THOSE ASPIRATIONS/GOALS?



STRATEGIC PLANNING RETREAT: COLLEGE OF SCIENCE ACADEMIC LEADERSHIP TEAM (Dean, Associate Dean and Department Chairs)

- ▶ 1 ½ days in April, 2019
- ▶ Objectives:
 - ▶ Revise CoS vision statement
 - ▶ Identify overarching strategies
 - ▶ Solidify strategic initiatives considering:
 - ▶ Faculty 1x1s with the dean
 - ▶ Faculty expertise
 - ▶ Workforce opportunities
 - ▶ Consider and begin to identify leading edge drivers (action items), partners and necessary resources for our delineated initiatives



COLLEGE OF SCIENCE: VISION STATEMENT

- ▶ ***Scientists and mathematicians are problem solvers:***

The College of Science provides student-centered, inclusive, active educational experiences that empower students to achieve their potential and “lead the field” in meeting tomorrow’s challenges.



GENERAL OVERALL STRATEGIES

- ▶ **Improve comprehensive advising**
- ▶ **Generate funding opportunities**
 - ▶ Undergraduate research
 - ▶ High-impact educational experiences
- ▶ **Broadcast our story**
- ▶ **Value and empower College of Science staff**
- ▶ **Implement innovative pedagogical practices to increase retention**
- ▶ **And...**



WE ARE FOCUSED ON
INCREASING DIVERSITY
ACROSS ALL OF OUR
PROGRAMS IN THE CoS:
FACULTY AND STUDENTS



**Multicultural Advancement of
Science (MAS) & Professional
Development of Faculty**



WEBER STATE UNIVERSITY
College of Science

\$970,000 in NSF Grants to Improve Graduation Rates!

- ▶ Provide need-based scholarships to 30 low-income, high-achieving students studying the physical sciences
 - ▶ Five years of grant funding, which spans departments in both WSU's College of Science and the College of Engineering, Applied Science & Technology.
 - ▶ Supports research into “best practices” for retention of low income students in the physical sciences.
 - ▶ Current graduation rate = 12%; Projected graduation rate = 50%
- ▶ GETUP Grant for under-represented students in Earth and Environmental Sciences
 - ▶ Supports early outreach efforts to high schools and currently enrolled WSU students
 - ▶ Planning a summer bridge program with geology field trips to YNP
 - ▶ Early research opportunities for participating students
 - ▶ Project will focus on participation from females and Latin American students



LOOKING AHEAD: 4 COLLEGE-WIDE COLLABORATIVE INITIATIVES

AGREED TO BY THE
COLLEGE OF
SCIENCE
LEADERSHIP TEAM:
DEPARTMENT CHAIRS,
THE ASSOCIATE DEAN
AND THE DEAN



FOUR COLLEGE – WIDE INITIATIVES

- ▶ **ENVIRONMENTAL SCIENCES PROGRAM:** Meeting tomorrow's environmental challenges
- ▶ **SECONDARY EDUCATION DEGREES:** Supporting a new generation of science and math educators
- ▶ **WORKFORCE READINESS:** Preparing tomorrow's science and mathematics professionals (stackable credentials and certifications)
- ▶ **EDUCATIONAL EXCELLENCE:** Facilitating excellence in our teaching of tomorrow's scientists and mathematicians



ENVIRONMENTAL SCIENCES BS DEGREE: MEETING TOMORROW'S ENVIRONMENTAL CHALLENGES

- ▶ GOAL: Interdisciplinary Environmental Science BS degree
 - ▶ Fall 2020
- ▶ Dr. Rick Ford: Lead Faculty
- ▶ ENVS Task Force
 - ▶ Draft a four-year curriculum for college-wide review
 - ▶ Degree will involve all of the departments across the College of Science



ENVIRONMENTAL SCIENCES BS DEGREE

Physical
Sciences
Emphasis

Life
Sciences
Emphasis

Future:
Marine Sciences
Emphasis



LEADING EDGE DRIVERS: ACTION ITEMS

- ▶ Enhance undergraduate research opportunities
- ▶ Broadcast the new program early and often
- ▶ Develop internship opportunities
 - ▶ NGOs, federal and state agencies, private businesses etc.
- ▶ Advisory board
- ▶ Environmental sciences curriculum
 - ▶ Leading edge
- ▶ Student club
 - ▶ Professional society (Ex. Association for Environmental Studies and Sciences)
- ▶ Create student cohort learning communities



PARTNERS

- ▶ Sustainability Practices and Research Center (SPARC)
- ▶ Department of Geography in the College of Social and Behavioral Sciences
- ▶ WSU Internship Office
- ▶ State and federal agencies (USFS, BLM, USFWS, USGS etc.)
- ▶ Local businesses and corporations
- ▶ CoS departmental and college advisory boards
- ▶ Alumni



WHAT HAS HAPPENED SO FAR:

- ▶ Office of Academic Affairs invited college deans to submit proposals
 - ▶ Three faculty-lines
- ▶ College of Science leadership team
 - ▶ New interdisciplinary faculty line in Environmental Science
 - ▶ Excellent teacher who could build a vigorous undergraduate research program
- ▶ Strong support from other Colleges
 - ▶ Environmental Sciences proposal was strongly supported by all other deans
- ▶ Hired Dr. Caty Tems
 - ▶ Cuyamaca College in CA, where she is a tenure-track Assistant Professor
 - ▶ Marine geologist and geochemist



AND A SECOND FACULTY LINE....

- ▶ Departments of Earth and Environmental Sciences in the CoS and Geography in the CSBS also received money through Academic Affairs to hire an Assistant Professor who will be a joint appointment in the CoS and CSBS (first at WSU)
 - ▶ Received significant support from other college deans
 - ▶ New hire will assist with the implementation of the Northern Utah Geospatial Education ((NUGeoTec) Program at WSU
 - ▶ “Geospatial Technologies comprise a huge and growing toolbox [Geographic Information Systems, Global positioning Systems, cartography, phone/vehicle navigation, drones, satellites, etc.] that finds more uses and users every year.”
 - ▶ This new faculty position will complement and add to the new Environmental Science degree
- ▶ Dr. Ryan Frazier
 - ▶ University of British Columbia



WHY ENVIRONMENTAL SCIENCES?

- ▶ CoS faculty explicitly trained as environmental scientists
- ▶ Regional environmental issues
- ▶ Growing environmental concern and urgency
 - ▶ Attractive major
- ▶ Interdisciplinary degree
 - ▶ Fully supported by all departments in the College
 - ▶ Faculty and departments working collaboratively across the College
 - ▶ Supported across the campus by all other colleges.
- ▶ Job growth projected to grow 11-12% from 2016 – 2026 (Bureau of Labor Statistics)
- ▶ Median salary in 2018 = \$71,130 (Bureau of Labor Statistics)



Current Departmental/College Expertise in Environmental Sciences

- Hydrology
- Environmental geology
- Surficial processes, landforms and landscape evolution
- Geospatial science and technology
- Climate change
- Emerging diseases
- Genetically modified organisms
- Biofuels
- Bioremediation of pollutants
- Waste treatment
- Water quality
- Public health
- Infectious Diseases
- Microbiomes
- Environmental chemistry
- Sampling & mine waste procedures
- Atmospheric measurements and modeling
- Toxicology and animal physiology
- Toxicology and ecosystem ecology
- Wildlife ecology and management
- DNA fingerprinting
- Aquatic ecology and fisheries
- Biogeography
- Field ecology and entomology
- Experience in solar energy/industry
- Environmental microbiology
- Environmental physics
- Mycology and soil ecology
- Plant ecology, lichenology
- Physiological plant ecology
- Biostatistics
- Mathematical modeling



Departmental Interest Across the College

- ▶ From the Department of Earth and Environmental Sciences
 - ▶ In addition to traditional deep-time geoscience, we want to be the home for students interested in an interdisciplinary, whole Earth approach to working on big societal issues, such as:
 - ▶ • climate change mitigation & response;
 - ▶ • water availability & sustainable use;
 - ▶ • natural disaster preparedness; and
 - ▶ • environmental health.



From Microbiology: Discover the Solution

- Antibiotic resistance
- Climate change
- Emerging diseases
- Genetically modified organisms
- Food security and safety
- Bioterrorism threats
- Biofuels
- Bioremediation of pollutants
- Waste treatment
- Water quality
- Public Health
- Infectious diseases
- Microbiome
- Medicine and Dentistry



RESOURCES NEEDED

- ▶ Field equipment
- ▶ Transportation and/or funding for field trips
- ▶ Marketing funds
- ▶ Future faculty lines when the program grows



SECONDARY EDUCATION DEGREES: SUPPORTING A NEW GENERATION OF SCIENCE AND MATH EDUCATORS

▶ **Leading Edge Drivers (Action Items)**

- ▶ Enhance relationships with local school districts
 - ▶ Increase outreach efforts to teachers (more support for in-service teachers)
- ▶ Develop “Research Experiences for Teachers” (RETs)
 - ▶ Physics: Invite high-school teachers into the Physics labs
 - ▶ Chemistry & Biochemistry:
 - ▶ Focus on the new state guidelines
 - ▶ Work closely with College of Education
 - ▶ Teachers: lab setups and take downs with a focus on safety
- ▶ Support student club: Tomorrows Educators Advocating for Mathematics and Science (TEAMS)
- ▶ Work with our science and mathematics educators to improve our outreach efforts



PARTNERS

- ▶ School district STEM section directors
- ▶ Local secondary science and mathematics teachers
- ▶ Moyes College of Education and their new Dean, Dr. Kristin Hadley
- ▶ Utah State Office of Education (USOE)



RESOURCES NEEDED

- ▶ New faculty line in Mathematics Education
- ▶ Fill Dr. Lin Xiang's open faculty line in Life Sciences Education
- ▶ WHY?
 - ▶ Well trained science and mathematics teachers are needed in our local communities



WORKFORCE READINESS: PREPARING TOMORROW'S SCIENCE AND MATHEMATICS PROFESSIONALS

- ▶ **Leading Edge Drivers (Action Items)**
 - ▶ Seminar Series: “Jobs You Did Not Know That You Wanted”
 - ▶ Invite a broad spectrum of professionals
 - ▶ speak about their own jobs,
 - ▶ available jobs in their fields and
 - ▶ job skills needed for the work that is happening in their field
 - ▶ Incorporate undergraduate research experiences early in the curriculum
 - ▶ Create opportunities for “stackable credentials”
 - ▶ Create disciplinary “emphases” to guide advising
 - ▶ Develop internship opportunities
 - ▶ Focus on faculty vitality (development)



PARTNERS

- ▶ WSU Career Services
- ▶ Hill Air Force Base
- ▶ CoS departmental and college advisory boards
- ▶ WSU alumni
- ▶ Local, state and federal governmental agencies
- ▶ Local and regional businesses



IDENTIFIED STACKABLE CREDENTIALS

Life Sciences

Launching this fall:

Associates degree in the Biological Sciences

Attract new majors into Botany, Microbiology or Zoology and/or any major in the CoS

Physical Sciences

In development:

Associate of Applied Science (AAS) in the Physical Sciences (mirrors the AS degree in the Life Sciences)

Goal: Attract new students into Physics, Chemistry & Biochemistry and Earth & Environmental Sciences and/or any major in the CoS

Other

In development:

National Association of Interpreters certification

Goal: Provide Botany, Zoology and Earth & Environmental Sciences majors a certification that will allow them to compete for naturalist positions in state and national parks



Stackable Credentials cont.

Physics

Certificate or Minor in
Materials Science

Microbiology

In development -- new
emphases in:

Public and Environmental
Health

Medical Microbiology

Applied and Industrial
Microbiology

Botany

Certification in Field Botany

Goal: Provide students
with the skills necessary to
meet federal requirements
for botany, ecology, natural
resources GS4 positions



New Degrees by Department

Physics

Under consideration:

Engineering Physics BS degree with possible ABET (Accreditation Board for Engineering and Technology) certification

Mathematics

Launching this fall:

BS degree: Computational Statistics and Big Data



RESOURCES NEEDED

- ▶ Instrumentation support
- ▶ Continued faculty vitality/development support
- ▶ Funding sources for undergraduate research



EDUCATIONAL EXCELLENCE: DEVELOPING EXCELLENCE IN TEACHING TOMORROW'S SCIENTISTS AND MATHEMATICIANS

▶ **Leading Edge Drivers (Action Items)**

- ▶ Review the Rank and Tenure Process
- ▶ Increase funding for HIEE and undergraduate research through course fees and external funding opportunities
- ▶ Encourage sharing of active pedagogical teaching and learning strategies
- ▶ Support faculty professional development
- ▶ Create student learning communities
- ▶ Support student clubs and organizations
- ▶ Develop and support Course-based Undergraduate Research Experiences (CUREs) for early exposure to undergraduate research



PARTNERS

- ▶ WSU Teaching and Learning Forum
- ▶ Associate Provost for High Impact Educational Experiences (HIEE)
- ▶ Academic Affairs

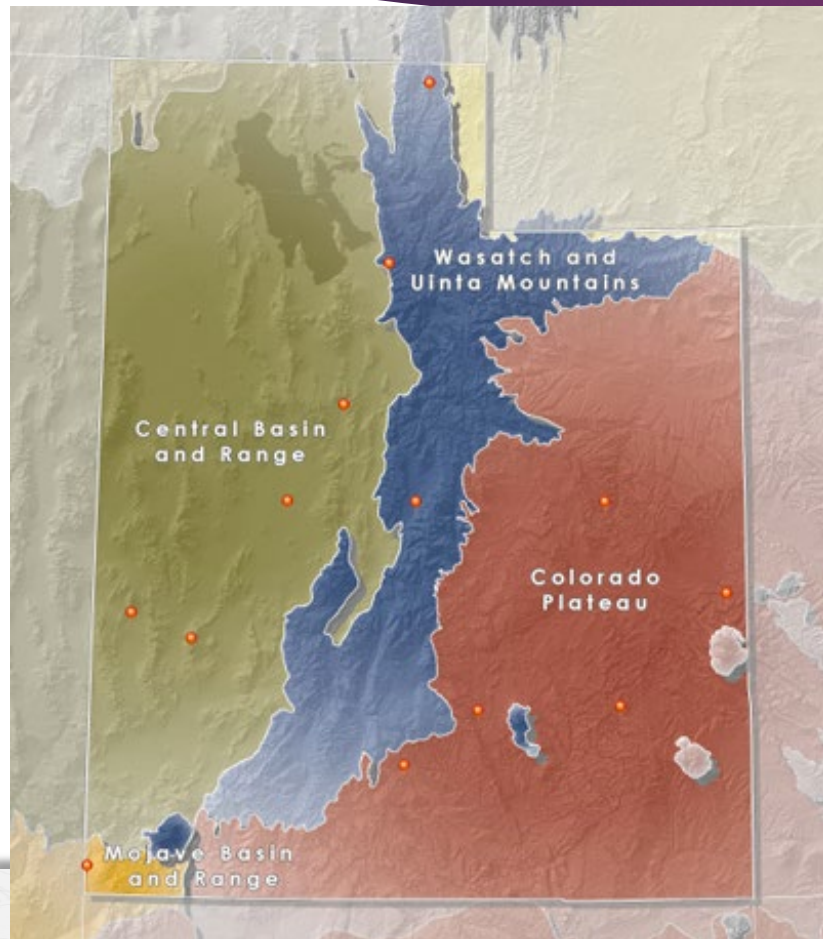


RESOURCES NEEDED

- ▶ Instrumentation Support
- ▶ Support for Field Research
 - ▶ Transportation
 - ▶ Field equipment
 - ▶ Funding sources for undergraduate research
 - ▶ Funding sources for faculty vitality (development)
 - ▶ Future dream for the College: Field Station



BIG DREAM: College of Science Field Station



University of Utah = 5 field stations

Utah State University = 2 field stations

Snow College = 2 field stations

Utah Valley University = 1 field station

Brigham Young University = 1 field station

Dixie State University = 0 field stations

Southern Utah University = 0 field stations



THANK YOU!

▶ ***The College of Science appreciates your support!***

