

# College of Sciences Strategic Plan: 2021 - 2025

## Executive summary

The College's Strategic Plan includes both ongoing and future initiatives to increase our upward trajectory to achieve our Top Tier goals. Our initiatives align with UNLV top tier goals, with a five-year plan that emphasizes critical goals that cut across initiatives.

## Initiatives

CoS initiatives are focused on five avenues to achieve goals for the next five years. These initiatives are summarized under the specific foci, which are expanded in subsequent pages:

- ◆ Undergraduate student success
- ◆ Research expansion
- ◆ Graduate student success
- ◆ Development to support graduate student success and infrastructure expansion
- ◆ Increase diversity of the professorate

## Critical Goals for 2021 – 2025:

- ◆ Improve program rankings
- ◆ Build on unique areas of strength, including:
  - Arid regions Ecology and Hydrology
  - Exoplanets
  - High pressure physics
  - Microbiomes
  - Applied math
  - Personalized genomics
  - Radiation chemistry
- ◆ Increase extramural funding of research programs
- ◆ Increase numbers of PhD graduate students
- ◆ Increase progression to degree with training grants
- ◆ Build infrastructure to enhance and expand strengths
  - Shared equipment cores and theme labs
- ◆ Broaden the Nevada STEM workforce through education and training at the undergraduate and graduate levels

## **Focus on Undergraduate Success: Retention, Progression, Completion**

### **Revision of precalculus gateway Math instruction**

- Increase passage rates in Math 120, for general education requirements
  - Math Learning Center transferred to COS, now Department of Mathematic Science, collaborating in co-requisite development
  - Prior: Math 95 was a pre-requisite for Math 120
    - Spring 2017: Math 95 became co-requisite for Math 120
    - Fall 2019: passage rates improved by 25% across all sections, stable for five semesters.
- Increase passage rates in Math 124, for general education requirements
  - Spring 2020: Math 96 is a pre-requisite for Math 124
  - Fall 2021: co-requisites required for all Math 120, 124 students
- Continuing co-requisite courses scheduled every semester

### **Expand revisions to include calculus instruction to support STEM programs**

- First step to support improved passing rates for Engineering students
  - Recruit Engineering faculty to teach Math 181 section for COE students
  - COE Math sections highlight importance of math foundations
  - Common final examination for COS and COE students
- Establish co-requisite courses for Math 176 and 181, Calculus
  - Math 176: Include videos of business and social science faculty highlighting the importance of math foundations for their fields

### **Support and assess progression at each stage to degree:**

- Establish and maintain quantitative measures of learning outcomes in core courses for majors' degree programs
  - Common exam questions across all sections for introductory and milestone core courses used to assess learning outcomes across sections.
  - Enhance College of Sciences Advising Center strength to increase student access to timely advising
- Establish Assistant Dean of Student Success for proactive support of RPC
  - Coordinates instruction across campus units for timely progression to degree
  - Oversees College and Unit scholarship programs
    - Ensure awards occur according to MOU with Donor
    - Ensure timely announcements of awards in support of Donor relationships
  - Student recruiting
    - Recruit COS faculty for middle school and high school visits
    - Coordinate internships and career services
  - Regular assessment of progression to degree, and progress in learning outcomes

- Establish capstone courses in every degree program
  - Provide data to Asst. Dean for Student Success to assess overall learning outcomes for degree programs

### **Expand undergraduate research opportunities**

- **Gateway to broaden participation in research: Course-based research experiences**
  - Implemented a two-semester 200-level “Phage discovery at UNLV” research course with HHMI funding (Biol207 & Biol217)
  - Expand the number of course-based undergraduate research experiences
- Expand participation of UG researchers in active research labs
  - Spring 2020: COS supports 1 Undergraduate Research fellowship for COS majors who pursue summer research with a UNLV faculty mentor
  - Increase to 5 summer research fellowships through grant IDR funds and donor-supported, named fellowships
  - Develop COS gateway website for students seeking undergraduate research opportunities in faculty labs
  - provide incentives for COS faculty who publish with undergraduate students
- Track subsequent career paths for COS UG researchers through alumni relations

### **Increase recruitment of Honors College undergraduates**

- Increase outreach to Nevada high school science classes
  - COS faculty participation in [SISTEM](#) (Student Interaction in STEM) or similar series for local high school students
- Increase outreach to Nevada middle school students
  - COS faculty participation in CODE camps, such as [2019 Summer Code Camp at UNLV](#) for local 6<sup>th</sup> – 8<sup>th</sup> grade girls
- Coordinate COS outreach with Honors College outreach

# Focus on Research Expansion

## **New tenure-track faculty hires are strong researchers**

- Since July, 2017: 9 tenure-track faculty hires
- Target replacement tenure-track hires to local areas of strength, balanced with needs/opportunities of the unit
- Additional tenure-track hires target areas that overlap current areas of strength in units and impactful areas for field that align with national funding priorities
- Advertise positions across a diverse range of professional organizations
- Expectations for tenure properly aligned with College and Unit goals

## **Expand extramural research support profile**

- Tenure track faculty hires expected to be research active, judged by:
  - Track record of research activity
  - Training PhD students
- for NIH-funded faculty, transition to competitive proposals for NIH R01 awards
  - when appropriate, prioritize hire of tenure-track faculty position applicants with NIH K-type “transition to independence” awards, and ensure the offer meets agency requirements to transition to R00 award.
  - foster collaborations with NIPM and other relevant research entities

## **Increase ratio of graduate students per tenure-track faculty for CoS**

- Spring 2020: Continuing enrolled graduate students: 89 MS, 162 PhD : 112 tenure-track + tenured Faculty 0.79 for MS, 1.4 for PhD
- College GA’s or other rewards to units with track-records of:
  - Supporting graduate students with research grant-funded RA’s, TTDGRA’s, training grants, or other fellowships
  - Improving normative time to degree for graduate students
  - Papers published with graduate students
  - Emphasize distribution of state-funded GA’s to tenure-track faculty, then to faculty with demonstrated graduate mentoring, as judged by unit metrics

## **Improve departmental rankings in national/international indices**

- Faculty visibility through
  - seminars at prominent institutions
  - keynote and plenary talks at international conferences
  - service on federal grant review panels
  - publication in Nature index journals
- Placement of PhD and MS graduates in nationally or internationally competitive positions

## **Increase numbers of Post-Doctoral Scholars and Research Scientists**

- Increase COS research visibility for attracting post-doctoral scholars
  - Emphasize intra- and inter-departmental areas of strength through up-to-date research “cluster” websites
    - Current example of a cross-departmental site:
      - [Nevada Institute of Personalized Medicine](#)
    - Cross-department area to add:
      - Hydrology site that includes both in geology and biology
  - Support high-quality research area descriptions that emphasize group strengths and shared resources on COS unit websites
    - Current example:
      - [Physics and Astronomy](#):
- Incentives for faculty who mentor fellowship-funded post-doctoral scholars and/or research scientists with career development awards
  - Reward grant funded PD mentors with GA-funding
  - Establish timely graduation PD fellowships to encourage shorter normative time to degree, provide additional PD researchers, and enhance the career opportunities of our PhD graduates.
  - PD fellowships aimed at increasing diversity in the professorate should be a high priority. This should involve institutional support, with the aim of supporting talented diverse PDs with the larger goal of mentoring them to enter the professorate, either at UNLV or elsewhere.

## **Focus on Graduate Student Success: Recruitment, Retention, Progression, Completion**

**Planned Metrics: PhD graduation rates, time to degree in UNLV programs vs. national norms for field or sub-field.**

**Encourage unit-wide recruitment efforts to bring strongest students to UNLV**

- Recruiting visits to southwestern US colleges/universities and elsewhere
- Web-based recruitment strategies
- Enhance program visibility through faculty efforts seminars, conferences and meetings

**Reduce normative time to degree by 15% (resulting in 15% more graduate per year).**

- Incentivize departmental graduate programs with GA allocations, including
  - Numbers of college-funded GAs to reward
    - Improvements in normative time to degree
    - Increase grad student co-authored papers (up to 1 year post-degree)
- Incentivize faculty mentoring by emphasizing time to degree and grad student co-authored papers as criteria for dissertation chair status after tenure.

**Graduate student expectations for publication of independent research**

- Course-based preparation or other formal cohort-wide introductory experience
  - Example: Biol702: Core Course
- Lagging students identified quickly in 1<sup>st</sup> or 2<sup>nd</sup> year for a graceful MS exit plan
- Foster camaraderie within and between cohorts to enhance retention

**Track grad student progression through annual advisory committee meetings**

- Advisory committees clearly document yearly goals/expectations
- Advisory committees document when student progress is unsatisfactory
- Encourage unit Graduate Coordinators to emphasize early intervention for students who do not make satisfactory research progress

**Seek funding for training grants**

- Seek federal agency and other opportunities to obtain training grant support. e.g.:
- NSF IGERT-type proposals
- NIH R25, T32 for MS-to-PhD training programs such as "Bridges to the Doctorate", to recruit first-generation college students and other under-represented groups such as minorities and economically disadvantage students
- Dept of Education GAANN awards, etc.

**Track graduate student placement in next positions**

- Maintain metrics on PhD and MS placement in next position, and continuing careers
  - Data will support training grant applications
  - Highlights can be used in recruiting efforts
- Establish and support an alumni network
  - Provide information on potential career tracks for matriculating graduate students
  - Assist in career networking for graduate students seeking opportunities

## **Development Focus**

### **Establish partnerships with local alumni, local business**

- Spring 2020: initial participation in MSTs-UNLV Symposium at Mission Support and Test Services site (current Nevada National Test Site contracted manager)
- Outreach to alumni through COS 50<sup>th</sup> Anniversary events in past year
- Continue to establish alliances through COS Advisory Committee members
- Identify internship opportunities for undergraduate and graduate students

### **Outreach to community to develop relationships with prospective donors**

- Las Vegas Science Café inaugurated with first presentation Oct 2014.
  - Local venue provides space at no charge on a monthly basis
  - Lay-friendly presentations in relaxed environment, food and beverage service available for purchase from venue
- College of Sciences 50<sup>th</sup> Anniversary Lecture series
  - Public lectures associated with scientist-guided tours of relevant laboratory and shared instrumentation facilities
  - Database of alumni?
  - Outreach to alumni
  - outreach to local philanthropic community?
  - alliance with College of Sciences Advisory Committee members?
- Public lecture series such as Frank Astronomy Lecture and Juanita Greer White Distinguished Lecture in Biology

### **Maintain relationships with current and past donors**

- Newsletters and invitations to public lectures
- Other opportunities for “behind the scenes” tours

### **Develop partnerships with scientific equipment manufacturers to obtain, update and maintain cutting edge shared instrumentation**

- Shimadzu arrangement to obtain instrument donations
- Nikon imaging instrumentation relationship for timely support and training expertise
- High profile instrumentation grant awards attracts vendor willingness to establish relationships with UNLV

### **Specific development campaigns**

- Rebel Science Grants
  - finishing awards for PhD students in their final year—Example, Hermsen Fellowship for SoLS students (donor funds now depleted)
- Endowed summer research fellowships for undergraduates

- Endowed professorships
- Endowments for building support
  - Donors to upgrade specific rooms, core labs, for name on room or facilities (similar to SEB and other universities)
- Endowed lecture series
  - Examples: Frank Astronomy Lecture, Juanita Greer White Distinguished Lecturer