**2021/2022 SSE Academic Faculty Proposal Summaries**

**Mirror Mentoring** Lead: Andres Guerra

Total Spend: $24,200 Funding Request: $24,000

Departments involved: Civil, Environmental, Multicultural Engineering Program, Admissions

Proposal Summary

To meet the Mines@150 initiative to have a highly qualified student body that matches state-wide demographics, measures beyond our current efforts must be taken. We propose to provide signature student experiences for underrepresented students that embody their experiences between their familiar community and the Mines community, which can look vastly different. This proposal provides the Mines students with an experience in which they mentor high school students with a focus on navigating the college application process for STEM careers. This is an opportunity for current Mines students to stay connected with their community, to provide examples for their success at Mines and promote the success of others from their community.

**Business in Design** Lead: Scott Houser

Total Spend: $65,076 Funding Request: $48,807

Departments involved: Economics and Business, Engineering, Design and Society and Student Life

Proposal Summary

*Business@Mines* is a central part of the *Mines@150* plan where the future of Mines is found at the intersection of technical skills, business acumen, and student passion. The primary goal of the Business in Deign project is to introduce students to business tools and applications in the context of a design project where students will more readily see the importance of a business perspective to the success of their design solution. This project develops formal business instruction and applications that are integrated into a design process to develop business acumen in the context of an engineering problem. In the pilot, EB faculty will deliver the business content in at least two sections of Design II through combination of online and in-person instruction. Consultation with Design II faculty identified the following business topics for the first year of the project: market analysis, product evaluation, entrepreneurship, and project management. In the second year of the project, we [propose to develop additional modules on innovation, decision-making, financial statements, and additional tools for project evaluation.

**Graduate Tracks** Lead: Roel Snieder and Kamini Singha

Total Spend: $64,000 Funding Request: $ 50,000

Departments involved: Office of Graduate Studies, Engineering, Design and Society, McNeil Center for E&I

Proposal Summary

To create a distinct Mines graduate student experience, grow the opportunities for graduate students to acquire professional skills, and significantly expand our new graduate student population, we propose to: (1) offer a number of professional development tracks through a system of flexible modules that can be taken on-campus and online [led by Roel Snieder], (2) develop and offer an onboarding course for graduate students (CSM 501) [led by Kamini Singha and Jenny Briggs], (3) offer a leadership and innovation (L&I) professional development series to prepare students to lead innovation initiatives within industry [led by Robin Bullock and Sid Saleh], and (4) market professional development opportunities to students at Mines as well as to working adults who may not have considered Mines [led by Sid Saleh and Robin Bullock].

**Money Matters**  Lead: Andy Pedersen and Becky Lafrancois

Total Spend: $37,532.14 Funding Request: $ 37,532.14

Departments involved: Economics and Business and Student Life

Proposal Summary

Rather than establishing a formal “Money Center”, the initial focus will be to work collaboratively with Student Life to determine how to best integrate Personal Finance modules into existing or newly created professional development opportunities. We will actively seek input from the students, Student Life, and other campus community members to determine the content that will be most valuable to students at various stages of their Mines experience. We will work to design and build four modules targeted to students at various stages of their academic careers, likely starting with a module geared to first-year students and one targeted at upper-class and graduate students. We would like to continue to offer “I Dig Money” while seeking out an alternative source of funding.

**Nuggets Badging** Lead: Jeff King

Total Spend (1): $13,213 Funding Request (1): $13,213

Total Spend (2): $18,069 Funding Request (2): $18,069

Departments involved: Metallurgical and Materials Engineering and Student Life

Proposal Summary

The first approach is a relatively light-weight system to encourage student participation in various activities. The badges awarded under the first approach would have relatively little value behind being a minor digital collectable (directly akin to a video game achievement – which no one should ever put on a resume). Implementation would take selecting a digital platform and establishing the policies necessary to administrate/maintain the platform. The formality and approvals needed for this approach should be relatively light.

The second approach envisions a much heavier system that would include Mines credentialing with the intention that badges become permanent educational records. This would be a major change in how Mines academic credentials are awarded (essentially creating another credential the is even smaller than a certificate or area of interest). Implementing this will take discussions and negotiations across campus and cannot happen without Faculty Senate involvement and approval (any new credential would be an academic offering, and academic offering are the domain of the Mines Faculty).

**Immersive Gaming** Lead: Elizabeth Holley

Total Spend: $ 48,000 Funding Request: $ 48,000

Departments involved: Mining, Payne Institute and Mines alumni

Proposal Summary

Policymakers have called for net-zero carbon emissions by 2050, but the transition to a low-carbon future will be metal and mineral intensive. Mines is uniquely positioned to lead the world in teaching and research to meet the growing need for raw materials in the energy transition, aligned with the Mines @150 vision for sustainable use of the Earth’s resources. From conversations with the VPRTT, plans are in the works to make this our first “Mines Grand Challenge.” How can we engage students from the get-go? We propose a fun, memorable, and collaborative interdisciplinary experience that connects our students’ technical education with entrepreneurship and innovation in the raw materials sector, literally by playing a game. We will develop a facilitated half day role-playing simulation based on Newtonian Shift, the participative game about the energy transition used by 1000s of sector leaders to date, and widely cited as a teaching tool of unprecedented impact. Our version of the game will become a signature Mines product, as well as a tool to engage partner organizations. The game will be played in the Edgar Mine, in order to enhance the immersive experience and provide students with an enthralling field experience at this quintessentially Mines location.

**M-Days** Lead: Neal Sullivan

Total Spend: $26,625 Funding Request: $26,625

Departments involved: Culture Change Working Group, Student Life and Mines Foundation

Proposal Summary

The proposing team broadly agrees with reviews that planning for the proposed M-Days event is the appropriate next step in bringing this idea to life. The proposed M-Days event is on the scale of E-Days, one of CSM’s biggest events of the year. With this in mind, the team proposes to use the requested funds to support an administrator to support the planning effort. Planning will include coordination with Student Life, SAIL, and the Alumni Association. The proposed administrator support would be central in coordinating the many action items that will arise through the planning effort. Answers to specific questions raised during the proposal-review process are provided below.

**Discovery @ Mines** Lead: Allison Caster

Total Spend: $84,750 Funding Request: $25,000

Departments involved: Physics, Math, and Honors

Proposal Summary

Toward the goal of becoming a top-of-mind, first-choice university, we propose a unique interdisciplinary “Discover” pathway that provides a challenging, inquiry- and problem-based integration of all the scientific and mathematics objectives of the first-year core curriculum. Piloted as a n Honors course, Discovery@Mines will combine best-practices from each field to satisfy the first-year calculus, physics, and chemistry requirements, with an overall reduction in student workload by minimized redundancies. The initial pilot will include 48 students, but will eventually be open to any incoming student motivated to join this innovative, interdisciplinary learning community. Mines students already arrive ready to join a community of discovers, excited to channel their passions toward shaping the future. This curriculum will fan that flame, integrating our most creative, engaged and innovative students into exciting learning experience that transforms them into the leaders of interdisciplinary STEM fields of tomorrow – starting with their very first day in the classroom.

**UG Research** Lead: Andrew Herring

Total Spend: $43,915 Funding Request: $43,915

Departments involved: Chemical/Biological and Geology/Geological

Proposal Summary

Undergraduate research is a growing area in the Mines Student Signature Experience in support of the Mines@150 goal of 70% of students participating in some sort of honors program. Mines Undergraduate Research Fellowships (MURF) provide funds for students who work on a project with a faculty member, some departments offer department level support for undergraduate research (GGE for example), many departments offer honors research tracks and research for credit at the 300 and 400 level, and individual faculty support undergraduate researchers through hourly contracts on funded projects. We envision a program that supports all of these efforts with a goal of providing juniors and opportunity to explore and get excited about research opportunities on campus while training undergraduate students to be research ready. Fully realized, this program is a course where students are formally taught the research enterprise (including hypothesis definition, data collection, errors, reporting, ethics, repeatability, notebook management, safety) combined with a real research project with real data that aims to results in a peer-reviewed publication. We envision students learning the research enterprise while analyzing previously collected data or performed well-defined and relatively easy to set up experiments, which allows for students to actually do research from day one without a lot of -re-requisite skills. At the end of the program the students will product a manuscript that can be submitted to a journal, included Reuleaux.

**Energy Efficiency** Lead: Paulo Cesar Tabares Velasco

Total Spend: $49,900 Funding Request: $49,900

Departments involved: Mechanical, Electrical, Civil and Engineering, Design and Society

Proposal Summary

The team has been working on initiatives and proposals to enhance the Mines campus and the

students’ learning experience not only by having more PV and sustainable buildings on campus, but also, to make the campus more flexible (capable of shift their electric loads using smart controls and energy storage) and accessible to students. In conjunction with the current efforts, we are proposing to create an *Institute for Energy Efficient Communities with Flexible Loads* to provide energy assessments on campus and in the wider Golden through project-based experiential learning and deployment. This new institute could leverage expertise and student/faculty interests from the Energy Minor, Advanced Energy Systems graduate program (AES), Smart Environments Design Studio, Solar Decathlon efforts and also create new project-based coursework and internships in collaboration with NREL, Red Rocks Community College, Mines’ Facilities, Sustainability, and Design and Construction Offices and McKinstry (and other close engineering partners). Our unique value proposition for the *Institute for* *Energy Efficient Communities with Flexible Loads* addresses the Mines@150 goals of: 1) producing differentiated and highly desired STEM-educated leaders (by providing unique learning and hands-on experiences), 2) being a go-to place for use-inspired research and innovation needed for challenges facing industry and society (by having students work on actual problems mentored by Mines alumni and faculty) and 3) being the exemplar for alumni affinity, visibility and involvement (by increasing relationships with local alumni and companies).

**Student Chapters** Lead: Neal Sullivan

Total Spend: $67,072 Funding Request: $62,000

Funding Authorized: $20,000

Departments involved: Mechanical, Student Life and Mines Foundation

Proposal Summary

This proposal seeks to advance student engagement with national professional societies to further the experiences of students, while directly promoting student careers following graduation. We request $62k in funding to provide one month of summer salary support for four faculty advisors of key student chapters of national organizations. Faculty advisors will use this support to work with student chapter leadership to create new, meaningful programming to be executed by the student chapter during the coming academic year. If awarded, a faculty senate subcommittee would solicit white papers from Mines 29 student chapters of professional societies. The Colorado Fuel Cell Center pledges $5k cost share in the form of summer salary support.

**Environmental Lab** Lead: Joseph Horan

Total Spend: $21,000 Funding Request: $20,000

Departments involved: HASS

Proposal Summary

This proposal will establish an annual Environmental Leadership Lab (ELL), a weekend camping experience that will take place at the start of the Fall semester at the Rocky Mountain Land Library outside of Fairplay. This event will feature a series of hands-on workshops and research activities prepared by faculty from HASS and other departments, as well as active learning experiences from campus organizations such as the Outdoor Recreation Center. Topics covered in these workshops will be designed to foster individual passions around the theme of “environment” and may include: environmental filmmaking, wilderness survival, local geology, conservation policy, etc. Following participating in the ELL, students will form a cohort of Environmental Scholars, and will remain engaged in the program throughout their Mines career by serving as counselors at future Labs, discussion leaders in upper-level environmental classes, and advocates for environmental initiatives across campus. This experience will support the Mines@1560 plan by fostering creativity and intellectual curiosity while cultivating leadership skills and strengthening a sense of affinity among Mines students while making environmental programs at Mines more distinctive compared to peer and competing institutions.