

SCS Department Vision – Matthew Wallenstein

The scientific fields represented within the Soil and Crop Sciences (SCS) department are thriving as a result of recent technology-enabled insights. For example, our understanding of the controls on soil formation has been transformed by advanced analytical techniques and creative experiments (including important contributions by members of SCS). Genomic techniques have revolutionized our understanding of plant physiology and enabled promising new tools to develop improved cultivars. At the same time, the need for innovative science-based solutions for soil health and sustainable crop productivity has never been greater. This confluence of scientific innovation and real-world challenges creates an exciting opportunity to build on the rich legacy and outstanding reputation of the SCS department.

The SCS department already supports cutting-edge research, education, and extension. By more closely coupling these activities and bridging expertise within the department to address complex issues, we can further increase our impact, reputation, and resources. In short, I would aim to make the impact of the whole greater than the sum of the parts. In particular, there is tremendous opportunity and interest in the interactions of plants and soils and the microbes, pollinators, and other organisms they interact with (i.e. the agbiome). Future scientific and technological innovations are likely to emerge from a systems approach that integrates all of these components and considers their interactions. This department is poised to lead in this area.

My vision for the SCS department is to be **the global leader in advancing understanding of soil and crop sciences, the interactions of soils and crops, and the application of this scientific knowledge to real-world management and technology for economically and environmentally sustainable solutions.**

This vision is motivated by several factors. First, as a land-grant university in a college of agriculture we have an obligation to conduct science that serves society, and all scientists want their science to make a positive difference in the world. To be clear, this vision does not preclude fundamental basic research. On the contrary, many complex real-world challenges are underlain by gaps in our fundamental scientific knowledge. Second, declining and uncertain federal research funding trends make it clear that we need to diversify our funding portfolio to increase our level of research support. The most exciting opportunities for new funding lie in team-based public-private partnerships. Third, the agriculture innovation economy needs scientists with a holistic understanding of agricultural systems, strong data science skills, and modern molecular approaches to fill jobs. Finally, extension is a tremendous asset that gives us a direct line to stakeholders, so that we are uniquely poised to identify emerging challenges and provide science-based solutions and decision-making tools.

To achieve this vision, I propose three specific goals:

1. *Identify the most important real-world challenges that can be addressed with our scientific expertise through deep engagement with a range of stakeholders.*

The extension staff, alumni, stakeholders, and the Colorado agriculture innovation sector are a tremendous resource. I would embark on a listening tour to strengthen these relationships and form stakeholder groups, which will inform our work on an ongoing basis. I would utilize a formal tool that I co-developed called the Research Impact Canvas (adopted from the Business Model Canvas for startups) to identify research, education, and extension activities focused on specific real-world challenges. Rather than a one-time exercise, I would encourage a continuous process of discovery and strategic alignment. Everyone will have a voice in this process, and diverse viewpoints will be encouraged and respected.

- 2. Support collaborative team solution-based science that links expertise within the department, the college, and beyond.*

It is clear that many of our most important challenges require interdisciplinary teams. But, team-based science can be challenging to manage, and the outcomes are not always aligned with traditional metrics of academic success. Thus, it will be important to update our departmental evaluation standards to acknowledge the many ways in which faculty can make an impact on their fields and society. Team-based science also requires a different skillset than traditional PI-led science. I would aim to foster future leaders through thoughtful mentoring of faculty, staff, and students. I would emphasize the development of private-public partnerships to support our research and education efforts. These partnerships evolve from relationships that must be developed over time, and culminate in the identification of areas of mutual interest.

- 3. Closely integrate our research, education, and extension activities to develop cutting-edge scientific insights for real-world challenges.*

Traditionally, scientific research has largely driven education and extension activities, but the inverse occurs more rarely. I view this as a missed opportunity. I believe that closely coupling these activities enhances all aspects of the department. It is clear how extension agents in the field can inform research needs. Every experienced teacher can share anecdotes of how preparing for class, student questions, or student-led research drove their research into new directions. Similarly, sharing new scientific insights with farmers and industry representatives, and listening to their stories and challenges can open up new avenues of research. I would work with our extension faculty and staff to elevate their impact on individuals and our base of knowledge. I would work with the faculty to review our undergraduate programs to ensure that we prepare our students to be leaders in myriad career paths. Today's jobs require a much broader range of technical, communication, and collaborative skills than ever before. The SCS could increase undergraduate enrollment (and thus tuition return funds) through a curriculum update and targeted marketing. I would encourage a culture of engagement and collaboration, where each of these activities is equally appreciated, supported, and encouraged.

The importance of developing and communicating a clear, ambitious, and exciting strategic vision cannot be underestimated. Along with a suite of core values, the strategic vision motivates departmental decisions, investments, and unites our team. My experience in the startup world has given me a unique perspective into best management practices. I have read numerous books, participated in several leadership workshops, and implemented these approaches in both the private sector and within academia. I have led an international research coordination network, a scientific society, and a university center. I have reflected on my strengths and weaknesses, sought constructive feedback, and evolved my leadership style.

When fully developed and implemented, my goal is to ensure that every employee and collaborator can answer WHY they are excited to be part of this department. If successful, the motivation for each member of the department will go beyond their own research, teaching, and extension interests and reflect a grander mission that they are proud to be a part of. I would foster a collaborative culture whereby everyone, regardless of position, feels they have a voice and are contributing to a collective effort.