**Position title:** UCCE Harvest Mechanization in Vegetable Crop Production Systems Specialist

**Position description:** This position will provide statewide research and extension leadership in the development of advanced systems to improve mechanization of vegetable crop harvesting. Educational and professional requirementsare a Ph.D. in engineering or equivalent. The successful candidate must have a record that documents productivity in research related to the position as evidenced by publications in peer-reviewed journals. Experience in mechanization of specialty crop production, especially vegetable harvest procedures and machinery design is desirable. The specialist will be expected to develop an externally funded, applied research program in mechanization and automation of vegetable crop harvest, and to develop an extension education and outreach program that extends information to diverse clientele groups (e.g., growers, equipment and technology companies, processors and food marketing companies, policy makers and the public). This individual will be expected to work closely with academic and extension colleagues, including academic senate faculty, government scientists, other cooperative extension academics, working in related fields (e.g., sensors, automation and control, robotics, remote sensing, systems engineering, and precision agriculture). The Specialist will work with CE Specialists and Advisors statewide, with AES faculty in Biological and Agricultural Engineering and departments at UCD such as Plant Sciences, Agricultural & Resource Economics, UC Riverside faculty and programs such as the UC Davis Agricultural Sustainability Institute.

**Justification:** California produces 58% of all US vegetables with a 2015 value of $8.3 billion. Numerous challenges to the vegetable industry include increasing labor costs, labor scarcity, increasing labor regulations, increasing production costs and food safety concerns. Harvesting costs in crops such as broccoli, lettuce and strawberry are over 50% of the total cost of production. Unless automation of vegetable crop harvesting can be realized, the acreage of hand harvested crops like these will decline in California in favor of locations with lower labor costs such as Mexico. The hand harvested sector of the vegetable industry is in crisis and it is up to the UC to rise to meet the challenge. The Specialist will provide leadership in vegetable harvest mechanization in order to maintain the competitiveness of the California vegetable industry. This position addresses core concerns of the *Sustainable Food Systems* ANR strategic initiatives.

**Extension:** This specialist will provide statewide and national leadership in matters concerning engineering issues in the areas of mechanical harvesting and handling of vegetable crop commodities, automated production systems, crop-machine-human interfaces, autonomous or robotic and remotely piloted vehicles and aircraft, and precision agriculture. The Specialist will plan, organize, and participate in programs designed to educate CE academics and other clientele including growers, grower organizations, equipment designers, manufacturers and equipment dealers, technology companies, policy makers, field workers and the general public about advanced harvest mechanization systems for agriculture. The Specialist will develop extension programs including print and electronic materials that address mechanization opportunities and challenges throughout agriculture and provide campus and county based CE academics with complementary up-to-date and extendible information on current mechanization research activities and outcomes and innovative and practical solutions for improved agricultural sustainability. Educational programs will be conducted for CE colleagues and others that focus on agricultural harvest mechanization. The specialist will also contribute towards existing outreach structures such as UC Research and Information Centers, UCCE workgroups, Commodity Research Boards, community colleges, etc. The specialist will interface with the growing and active private research and development sector that is addressing vegetable crop production and supply chain automation and provide relevant, unbiased information and forums for industry-grower-academic collaboration.

**Research:** Mechanization Engineering of vegetable crop production and harvesting will be the focus of this position. Accordingly, applicants should have the professional background necessary to conduct original applied research on mechanized production and harvesting operations and post-harvest handling with emphasis on the design, development, and testing of mechanically-actuated systems equipped with advanced sensors and controls principally for vegetable harvesting applications. Potential research areas are mechanization technologies and machine systems for California vegetable crops that can improve agricultural production and sustainability, product safety and quality, equipment adoption and maintainability, and enhance the working environment in California agriculture.The candidate will collaborate with academic senate faculty, campus and UC Cooperative Extension (UCCE) academics and stakeholders on emerging issues in agricultural mechanization, and develop and conduct research and extension initiatives to address and complement the development of new mechanization approaches, processes and systems, evaluate the effectiveness of new technologies, and provide guidance on the adoption and operation of mechanized alternatives. We expect the successful candidate to publish their research findings in refereed journals such as the Transactions of the ASABE, Applied Engineering in Agriculture, and similar outlets, and in various other electronic and print venues such as California Agriculture or UC/ANR publications, among others. The candidate is expected to demonstrate continued professional competence and activity related to their area of expertise and establish working relationships with scientists, extension and industry personnel both nationally and internationally. The candidate will also provide University and public service through department, campus or ANR committees, advisory councils and boards, ANR program teams and workgroups, and similar activities. The candidate will serve as a focal point and contact for growers, equipment manufacturers, state and federal agencies and others seeking impartial and sound advice on matters relating to vegetable crop production and mechanization.

**ANR network:** Many AES scientists are involved in various aspects of vegetable crop production and management, including agricultural sustainability, economics, entomology, environmental protection, irrigation, plant breeding, plant pathology, plant physiology, post-harvest, and soil fertility. Although the emphasis will be on vegetable crops, management principles developed will be extended to other crops through collaboration with other scientists and complement the efforts of other UCCE Specialists working in the area of agricultural mechanization and postharvest systems. The Specialist will be in a position to build multi-disciplinary teams to address complex problems associated with harvesting of soft perishable commodities. Collaboration with Farm Advisors will be expected to effectively address specific regional concerns.

**Network external to ANR:** The vegetable industry has a well-developed network of machine shops and design engineers with which to collaborate in the process of developing state-of-the art harvesting equipment. This Specialist will be a unique resource for these groups, providing both technical expertise and coordination of efforts. Vegetable crop production and harvest mechanization are of interest to researchers in other states such as Arizona and Florida, therefore there is ample opportunity for multistate collaboration.

**Support:** The duty station for this position will be at the UC Davis Campus and will be supported by the Department of Biological and Agricultural Engineering. Specialists serve as an integral member of the faculty with appropriate support for office and research space and access to staff who will handle grant administration and personnel matters, among others. Financial support would include a startup package and an annual CAES allocation for CE Specialists. Most funding for research and outreach activities will come from external sources.

**Other support:** Numerous sources of financial and logistical support will be available to this position. These include commodity research Boards (celery, leafy greens, garlic & onion, pepper, melon, carrot, etc.), most of which support engineering and production research. State support will be available from the CDFA Specialty Crops Block Grants Program. USDA grant programs for Specialty Crops, Sustainable Agriculture, and Organic Research Initiative will also be available for support.

**Location:** Position will be located in the Dept. of BAE at UC Davis. Many researchers with interests in crop mechanization are located in this department and others. Location at UCD provides access to specialized machine shop support and allows for training of graduate students.

**Developed and proposed by:** Position was developed by the Depts. of Biological and Agricultural Engineering, Plant Sciences, LAWR, and the ANR Vegetable Crops Program Team. External stakeholder groups consulted include the California Leafy Greens Research Board and the California Specialty Crops Council.