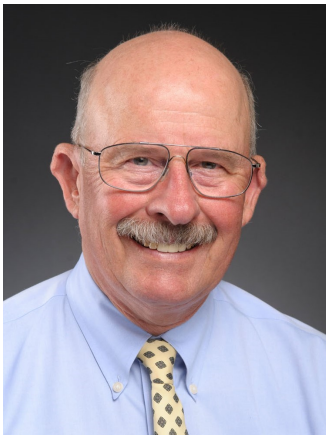
Increasing Profitability by Improving Efficiency of Montana's Farm and Ranch Lands

PI Informational Flyer



Dr. Barry Jacobsen. PhD
Associate Director, Montana Ag Experiment Station
Head, Department of Research Centers
Dr. Jacobsen is the coordinator of the Ag MREDI grant.

Dr. Chengci Chen, Professor/Superintendent
Eastern Ag Research Center
Chengci has been leading the statewide pea, lentil, and chickpea variety testing, selecting varieties with early growth vigor and higher nitrogen fixation ability, water use and studying factors affecting pea yield and protein content.

Dr. Perry Miller, Professor, Land Resources & Environmental Sciences
Exploring pea protein fractionation as a new and exciting market potential for Montana pea growers. In complement to Dr. Chen's research, Dr. Miller's goal is to promote Montana as a consistent source of high protein peas to attract investment in the pea fractionating infrastructure.

Dr. John Peters, Professor, Chemistry and Biochemistry
The Peters' lab is evaluating the microbial ecology of soils in various crop rotation regimes across the state. The work is examining the influence of microbiome and biological nitrogen fixation on soil health and crop productivity.

Dr. Carl Yeoman, Asst. Professor, Animal & Range Science
The Yeoman lab is examining microbes that can naturally colonize the foregut of domestic livestock species for their ability to rapidly assimilate the potentially toxic levels of nitrate and nitrite found in many cover crops to microbial protein. The ultimate goal being to develop direct-fed microbials that can be used to prevent nitrate- and nitrite- toxicosis, and thereby reduce the barriers to livestock-mediated cover crop termination.

A Statewide Initiative

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Dr. Darrin Boss, Superintendent, Northern Ag Research Center
Darrin is coordinating the cover crop subproject, which entails evaluating and developing alternative economic streams (grazing or haying) when integrating cover crops into wheat fallow rotations. In addition, he is collaborating with agronomists on a statewide effort to evaluate different mono and polyculture cover crop's above ground biomass and forage quality at all seven of the Research Centers.

Dr. Emily Glunk, MSU Extension Forage Specialist
Co-PI on the cover crop grazing subproject; responsible for helping to coordinate the cover crop variety trials, as well as running her own forage quality and grazing assessment of cover crops projects in Bozeman and the surrounding area.

Dr. David Weaver, Professor, Land Resources & Environmental Sciences
Dr. Weaver is evaluating the role of increased floral resources in Montana's agricultural landscape on the overall success of parasitoids that kill wheat stem sawfly larvae. The sugars in cover crop and pulse crop flowers may increase the viability and reproductive success of two species of native parasitoids, of which are being measured in the field and laboratory.

Dr. Joe Shaw, Professor of Optics and Electrical Engineering
Dr. Shaw is developing remote sensing methods that use hyperspectral imaging to identify weed species and to distinguish herbicide-resistant weeds.

Dr. Prashant Jha, Assoc. Professor, Southern Ag Research Center
Prashant has been involved with two major projects; 1) expanding herbicide options for weed control in pulse crops and mitigating herbicide carry over concerns in wheat-pulse rotation, and 2) field applications of hyper-spectral imaging to distinguish herbicide-resistant weeds in-crop and light-activated-sensor-controlled sprayers (WeedSeeker) for precision weed control in MT cropping systems.

Dr. John Sheppard, Professor, Gianforte School of Computing
Dr. Sheppard has expertise in probabilistic models and machine learning, performing research focused on novel optimization algorithms and risk management. He is working with a graduate student developing nonlinear models using machine learning based on neural networks. These models are being used to determine nitrogen fertilizer prescriptions to maximize crop yield and protein content with the goal of optimizing the net return to the farmer.

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Dr. Bruce Maxwell, Professor, Land Resources & Environmental Sciences
Bruce is the lead PI on the On-Farm Precision Experiment (OFPE) framework aspect of the MREDI Ag study, bringing 20 years of experience in precision ag to the study. He has extensive experience in analytical approaches to improving farmer decision on input management and is dedicated to producing tools that will allow farmers to see their decisions in the context of the many uncertainties of crop production.

Dr. Lisa Rew, Assoc. Professor
Land Resources & Environmental Sciences
Dr. Rew has been working with Dr. Maxwell and the OFPE project conducting weed sampling and evaluating the effect of weeds on crop yield and protein content.

Dr. Kelsey Jencso, Asst. Professor, UM, Director, Montana Climate Office (MCO)
The MCO is working to build a statewide network of weather and soil moisture stations that are incorporated into decision support tools for agricultural lands and rangelands. In collaboration with MSU's Ag Research Centers and Extension, these tools will be geared to assist stock growers and producers in real time estimates of irrigation demands, optimizing fertilizer and pesticide applications and assessing crop health and vigor to maximize productivity.

Dr. Clem Izurieta, Asst. Professor, Computer Science
Dr. Izurieta is a computer scientist with expertise designing and architecting large systems. In order to facilitate an extensible and modular architecture that is scaleable in the future, Dr. Izurieta is working with graduate students and professional staff defining the structural aspects of this architecture, including the definition of a new database schema capable of handling precision agriculture data.

Dr. Robert Payn, Asst. Professor, Land Resources & Environmental Sciences
Rob is a Co-PI on the team associated with the OFPE project. His first role is to co-lead the group engineering the software necessary to manage the data and workflows associated with precision agriculture optimizations. His second role is to consult with the greater OFPE project team on design of the appropriate agronomic models and optimization algorithms used for maximizing producers' profits.

Dr. Mike Giroux, Professor, Plant Science & Plant Pathology
Mike is working to improve durum varieties for Montana growers. In collaboration with MSU Research Center Scientists, he is conducting durum interstate trials and carrying out end product quality testing. He is also working with Northern Seeds to move forward with the development of new durum varieties.

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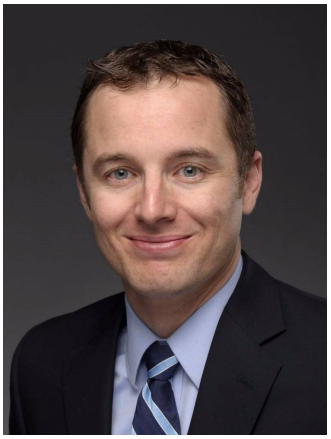
Dr. Pat Carr, Assoc. Professor/Superintendent, Central Ag Research Center
The cropping systems group at the CARC has contributed by conducting a field experiment at Moccasin as part of the cover crops effort directed by Dr. Boss, and by conducting cool-season pulse trials as part of the pea, lentil, and chickpea variety testing effort directed by Drs. Chen and Miller. In addition, the group has contributed to the OFPE effort directed by Bruce Maxwell. CARC's small-grain crop variety testing group has contributed to the durum effort of the MREDI project as well.

Dr. Roger Ondoua, Asst. Professor, Western Triangle Ag Research Center
Dr. Ondoua has conducted variety trials of pea, chickpea, lentils, durum wheat, and cover crops at the WTARC in Conrad. He has also assisted the On-Farm Precision Experiment with soil sampling.

Dr. Anton Bekkerman, Assoc. Professor, Agricultural Economics
Anton is evaluating the dynamic statewide economic impacts of transitioning to cropping systems that include pulses. He also works with the OFPE team to assess optimal precision ag strategies for maximizing profits and reducing uncertainties.



Dr. Colter Ellis, Asst. Professor, Sociology
Colter Ellis is working to better understand the decision-making process of Montana farmers and to identify barriers to new technology adoption. The goal is to find innovative ways to develop and integrate best management practices through collaborative participatory research.

Dr. George Haynes, Professor & Extension Specialist
Many innovations exist to improve the economic and environmental sustainability of farms, yet farmers often hesitate to adopt precision agriculture practices. We seek to identify and resolve economic and cultural barriers to these new techniques.

Dr. Mary Burrows, Professor, Extension Plant Pathology Specialist
Mary has been assisting Drs. Ellis and Haynes in their work to characterize and measure barriers that exist to the adoption of new technologies and agronomic practices. Her primary interest is how to modify extension education efforts to encourage adoption of best management practices for integrated pest management and encourage engagement in participatory research to benefit the community as a whole.