

**Name:** Craig Kvien

**Rank:** Professor and Chair National Environmentally Sound  
Production Agriculture Lab (NESPAL)

% Salary Budgeted: Instruction. 1% Research. 99%



### **Program Overview**

NESPAL is a horizontally structured, interdisciplinary research and education effort aimed at addressing the economic and environmental opportunities facing agriculture and rural communities. Our structure is a hybrid between the standard academic unit and the private sector partners we strive to help. Most NESPAL research and development programs would fall under the general themes of: Biotechnology and plant breeding, Native plants, Sustainable agricultural systems, Water quality and water use, and Precision agriculture, and K-12 outreach. Next to an on-site visit, the best way to learn about NESPAL is through our website at <http://www.nespal.org>.

Much of my time is spent handling NESPAL detail. I chair the advisory team of 6 members, write many grant proposals and deal with all the details associated with personnel and building operations. Most of our general support personnel (secretary, bookkeeper, computer, media, building and landscape people), our general operating budget, and our technical support people come from grant funds (\$2,500,000/yr in soft-funded personnel).

NESPAL also plays a major role in the AES and now Ag Education BS programs that started in the fall 2003 on the Tifton Campus. The Undergraduates in this program now number 50, and another 25 graduate students are on campus.

Today, 22 faculty participate in NESPAL programs. Ten have their office in NESPAL. We have 75 technicians, post-docs, graduate students, and other staff working with NESPAL projects, 62 are on soft funds. We have structured NESPAL to approach each effort with "success" as the end result. Projects are team-based and formed to address bigger picture issues involving natural and human resources and the use of purchased inputs and byproducts. The teams are generally successful in gaining external funding because of their long-term focus and track records. At the core of each team is a group of researchers who have in-depth knowledge of the necessary agricultural specialties. Business partners, community development specialists, other educators and end users fill out these teams to insure proper focus and speed development.

To further this effort and expedite implementation of our R&D programs at NESPAL and throughout the Tifton Campus, we, teamed with the Tifton Development Authority, the Georgia Research Alliance, the GA Economic Development Authority and OneGeorgia, to create the Georgia Agricultural Innovation Center. The new 11,000 sq. ft wing to the NESPAL facility, opened in May of 2003, houses a core group of economic development people and some start-up companies.

To help prepare the human resources needed to take advantage of the opportunities ahead, and better link to our regional school systems we established and host a campus-wide K-12 science and technology outreach program. We see this program as necessary to insure Georgia agriculture has the human talent needed in the future, and as a way to link to regional school systems to increase CAES students in the future (<http://www.ugastars.org>).

### **Precision Agriculture (where I spend my research time):**

Our precision agriculture team has explored many techniques and tools and is now focused on methods to better apply irrigation water, pesticides, and on wireless, internet-based sensing and control systems for agriculture.

The idea of a precision irrigation system has been around for a while, our precision ag team was the first to bring to the market a successful variable rate pivot irrigation system that can apply different rates of irrigation water to any part of field, based on need. After three years of systems design and testing the units are now commercially available (<http://www.betterpivots.com>). The new VRI tool better places water where needed, when needed and at the exact needed rate. Off target water applications like roads, waterways and non-cropped areas, boggy spots, or overlapping pivot areas are reduced or eliminated. It controls water output by controlling the time each nozzle (or bank of nozzles) are open or closed. GPS near the end of the center pivot helps determine location and an application map, stored in the controller, determines how much water is applied. From the research conducted on several commercial farms we have documented that some fields will save a great deal of water, over 4,000,000 gallons in a dry year, others less. The best part is that this new variable rate irrigation system retrofits on existing systems and saves water while maintaining production and profitability for the farmer and rural community. The number of farms using this technology started with an initial order of 25 in 2005, and now is expanding within and outside the state.

Our wireless program has developed and is now on a third generation autonomous “tractor”. Lightweight, versatile and controllable from anywhere you can connect through the internet, this development promises to significantly reduce the cost of producing crops. Additionally, we have put together and tested a wide variety of Internet-based sensing and control systems that enable growers to “look in and listen to” equipment, crops, and personnel through an Internet connection.

To further aid development of precision agriculture in the region, our team has hosted a number of Southeastern Precision Agriculture Trade Show and Forum, and more recently Conventions on Wireless Technologies for Agriculture (<http://www.nespal.org/wireless>), and BioEnergy (<http://www.gabioenergy.org>)

### **PROFESSIONAL AND PROFESSIONAL SOCIETY ACTIVITIES**

NCR180 National Precision Ag Research Group (1994 -)

Society Memberships: National Peanut Council (1986-), American Peanut Research & Education Society (1980-), American Society of Agronomy (1976-1996), Crop Science Society of America (1980-), Soil Science Society of America (1980-1996), Council on Agricultural Science & Technology (1986-2000), Sigma Xi (1989-2000) 1991 - Selected to the State Agricultural Experiment Station Leadership Development Program

### **CONTRIBUTIONS IN TEACHING and EXTENSION**

#### **Undergraduate Responsibilities**

AESC 3510 Computer Applications in Agriculture - Spring Semester yearly 10-12 students

AESC 3920 Internship – Every Semester including summer 3-5 students

AESC 4530/6530 Study Tour – Every Semester including summer 6-12 students

AESC 4520 Applied Technology in Production Agriculture – Fall '06 – 6 students

AESC 4950 Special Problems in AESC – 1-3 students/yr

AESC 4960 Undergraduate Research – 1-3 students/yr

CRSS 8210 Special Problems in CRSS – 1-3 students/yr  
CRSS 9990 Teach Practicum – Fall '06 2 students  
The Science Behind our Food, Fiber and BioFuels – traveling course for K-12 teachers –  
Summer '06

### **Graduate**

Currently I serve as major professor to one MS student and serve on two PhD Committee's.  
During the past 7 years I have served as Major Professor for one PhD and 3MS students and as a committee member on 3 PhD and 3 MS programs.

### **Publications** (last 7 years):

- Journal Articles: 14
- Abstracts: 38
- Others: 52
- Also publish a 16 page insert in 3 farmer-oriented magazines each year 35,000 growers reached

### **Grants** authored/co-authored (last 7 years):

- \$10,000,000, sources include USDA, US Dept of Ed, GRA, Commodity Orgs, Tifton Dev Authority, OneGA,

**Contributions to Professional Service** – Helped organize the AES degree program in Tifton, now chair the Tifton Campus Curriculum Committee, and serve as a member of the College Curriculum Committee.

### **Goals for the Next Five Years**

- Build Tifton Campus Graduate Student Program
- Expand K-12 program
- Strengthen wireless communication and control R&D program
- Enhance BioEnergy R&D program at NESPAL