

NAME: Stephen M. Welch

PROFESSIONAL PREPARATION:

B.S., Computer Science, Michigan State University	Dec. 1971
Ph.D., Zoology, Michigan State University	Feb. 1977
Postdoctoral Fellow, Entomology, Michigan State University	Feb.-Oct. 1977

APPOINTMENTS:

1990-present	Full Professor, Department of Agronomy, Kansas State University. Theoretical plant modeling. Acting State Climatologist (1989-92).
1993 (6 mo.)	Assistant to the Vice Provost for Academic Services. Assisted in general technology-related issues and activities as directed by the VPAS.
1992 (5 mo.)	Interim Director, KSU Computing and Network Services. Overall administration of networking, mainframe computing, public computing laboratories, and support activities for Kansas State University.
1987-1989	Computer Systems Coordinator, Kansas Cooperative Extension Service. Overall administration of the Computer Systems Office (which included the KSU Weather Data Library). Policy, planning, personnel, and budgetary management.
1985-1986	Technical Development Coordinator, Kansas Cooperative Extension Service. Needs assessment, financing, and administration of electronic technology development programs for information delivery.
1981-1984	Associate Professor, Department of Entomology, Kansas State University. Design of decision support systems for selected agricultural commodities.
1982 (3 mo.)	Visiting Professor, North Central Computer Institute, Madison, Wisconsin. Computerized teleconferencing applications in multi-state cooperative projects.
1977-1981	Assistant Professor, Department of Entomology, Kansas State University. Pest management modeling of economic insects.

PUBLICATIONS:

Related to activity:

Wilczek A, Roe J, Knapp M, Cooper M, Lopez-Gallego CM, Martin L, Muir C, Sim S, Walker A, J.Anderson, Egan J.F., Petipas R., Giakountis A., Charbit E., Coupland G., Welch S.M., and Schmitt J. Seasonal and geographic variation in sensitivity and balance of flowering pathways. *Science* 13 February 2009 323: 930-934

Koduru P, Dong Z, Das S, Welch SM, Roe J, Charbit E. "Multi-Objective Evolutionary-Simplex Hybrid Approach for the Optimization of Differential Equation Models of Gene Networks", *IEEE Transactions on Evolutionary Computation*, Vol. 12, No. 5, pp. 572 -590, 2008.

Hammer G, Cooper M, Tardieu F, Welch S, Walsh B, van Eeuwijk F, Chapman S, Podlich D. 2006. Models for navigating biological complexity in breeding improved crop plants. *Trends in Plant Science* 11:587-593.

Welch, S.M., J.L. Roe, S. Das, Z. Dong, R. He, M.B. Kirkham. 2005. Merging genomic control networks with soil-plant-atmosphere-continuum (SPAC) models. *Agricultural Sys.* 86:243-74.

Welch, S.M., Roe, J.L., Dong, Z. 2003. A genetic neural network model of flowering time control in *Arabidopsis thaliana*. *Agronomy Journal*, 95:71-81.

Other related publications:

Bulatewicz, T., Jin W., Staggenborg, S., Andresen, D., Miller, M., Das, S., Peterson, J., Steward, D.S., Welch, S.M. 2009. Calibration of a crop model to irrigated water use using a genetic algorithm. *Hydrol. Earth Sys. Sci.* 13:1467-1483.

Weinig C, Brock MT, Dechaine JA, Welch SM. 2006. Resolving the genetic basis of invasiveness and predicting invasions. *Genetica*. DOI 10.1007/s10709-006-9015-7.

Welch, S. M., G. Wilkerson, K. Whiting, N. Sun, T. Vagts, G. Buol, and T. Mavromatis. 2002. Estimating soybean model genetic coefficients from private sector variety performance trial data. *Transactions ASAE*, 45(4):1163-75.

Chen, X., S. M. Welch, N. Zhang, D. Armbrust. 2002. Measurement of change in soybean plant cross-sectional area under wind conditions via image processing. *Trans. ASAE*, 44(6):1923-29.

Roman-Paoli, E., S.M. Welch, and R.L. Vanderlip. 2000. Comparing genetic coefficient estimation methods using the CERES-Maize model. *Agricultural Systems*, 65:29-41.

SYNERGISTIC ACTIVITIES:

- Dr. Welch is KSU co-PI in an NSF Frontiers of Integrative Biological Research (FIBR) project. The project involves four US institutions with unfunded collaborators at six European plant molecular genetics labs. Its goal is to study the molecular evolutionary ecology of developmental signaling pathways of *Arabidopsis thaliana* in complex environments from the DNA sequence to continental scales. The five-year project combines approaches from molecular biology, molecular evolutionary genetics, quantitative genetics, evolutionary ecology, gene network modeling, and biogeography. The KSU team is responsible for the mathematical modeling of genetic networks and the micro-meteorological monitoring at all field sites.
- Dr. Welch is a member of the Steering Committee for the Ecological Genomics Institute (EGI) in Kansas. EGI links responses of living systems to environmental change at the genetic level. Most environmental change studies span only one or two levels in the biological hierarchy, but biological responses depend on both genotype and gene-by-environment interactions, the relationships studied here. The EGI integrates the activities of 35 faculty and postdocs.
- Dr. Welch is a member of the Executive Committee of the Consortium for Global Research on Water-based Economies. GROWE is developing coupled geo-spatial models for groundwater systems that include hydrological, plant, economic, and demographic components. It interacts closely with RIZA, the Dutch research and advisory body for inland waters management, renowned for its broad expertise in water issues world-wide. GROWE also uses constructivist methods in educational experiments on teaching interdisciplinary topics in Water & Society.

COLLABORATORS & OTHER AFFILIATIONS:

Collaborators and Co-Editors: Amasino, Richard, U Wisconsin; Anderson, Jillian Brown, U; Andresen, Daniel, Kansas St U; Boote, Kenneth, U Florida; Borevitz, Justin, U Chicago; Buckler, Ed, USDA/ARS, Cornell U; Bugbee, Bruce, Utah St U; Bulatewicz, Tom, Kansas St U; Chapman, Scott, CSIRO; Charbit, Erika, Kansas St U; Chen, Xingwen, Tetra-Tech Inc, Fairfax, VA; Cooper, Mark, Pioneer Hi-Bred International; Cooper, Martha, Brown U; Cooper, William Michigan St U; Correll, Melanie U Florida; Coupland, George Max Planck Inst for Plant Breeding Research; Croft, Brian, Oregon St U; Das, Sanjoy, Kansas St U; de Roos, Andre, U Amsterdam; Dechaine, Jenny, U Minnesota; Dong, Zhanshan, Pioneer Hi-Bred International; Donohue, Kathleen, Harvard U; Egan, J. Franklin, Pennsylvania St U; Giakountis, Antonis, Max Planck Inst for Plant Breeding Research; Grene, Ruth, Virginia Tech; Hammer, Graeme, U Queensland; Hsu, William, Kansas St U; Jin, Wei, Kansas St U; Jones, James, U Florida; Kirkham, Mary Beth, Kansas St U; Knapp, Mary, Kansas St U; Koduru, Praveen, Kansas St U; Leach, Jan, Colorado St U; Lopez-Gallego CM, Universidad de Antioquia, Columbia; Martin, Laura, Cornell U; Mavromatis, Theo, U Florida; Muir, Christopher, Indiana U; Murali, T. M., Virginia Tech; Myers, Chad, U Minnesota; Oviatt, Charles, Kansas St U; Peterson, Jeffrey, Kansas St U; Petipas, Renee, Brown U; Podlich, Dean, Pioneer Hi-Bred International; Purugganan, Michael, New York U; Roe, Judith, Kansas S U; Roman-Paoli, Elvin, U Puerto Rico; Ronald, Pamela, UC Davis; Schapaugh, William, Kansas St U; Schmitt, Johanna, Brown U; Sim, Sheina, Notre Dame; Steward, David, Kansas St U; Tardieu, Francois, INRA-ENSAM; Trick, Harold, Kansas St U; Vagts, Todd, Iowa St U; van Eeuwijk, Fred, Wageningen U; Vanderlip, Richard, Kansas St U; Valentine, Virgil, Kansas St U; Walker, Alexis, Brown U; Walsh, Bruce, U Arizona; Weinig, Cynthia, U Wyoming; White, Jeffrey, USDA/ARS Arid Land Agriculture & Research Ctr; Wilczek, Amity, Brown U; Wilkerson, Gail, North Carolina St U; Zhang, Naiqian, Kansas St U.

Graduate Advisor: William Cooper, Michigan State U

Postdoctoral Advisor: Brian Croft, Oregon State University

Thesis Advisor to: M.S – Xingwen Chen Tetra-Tech, Inc. (Fairfax VA); Kai Ma Kansas State University; PhD – Zhanshan Dong Pioneer Hi-Bred Int'l; Praveen Koduru, Kansas State University; Xinye Cai, Kansas State University; Total advisory committee participation – MS 10, Ph D 14; Postdocs sponsored - 3.