Monitoring the electrical potentials produced by the body can provide a wealth of information for both scientific and clinical endeavors. Recent advances in microelectrodes have enabled the development of fully integrated electrophysiological recording systems. Designing integrated circuits to observe many biological signals in situ presents significant technological challenges. Power must be minimized to allow for the limited power sources available and to prevent local tissue heating that could kill cells. Since multi-electrode arrays monitor weak extracellular voltages, amplifiers must be able to resolve ac signals in the microvolt range while rejecting large dc offsets present at the electrode-tissue interface. In some applications low frequency signals are important, yet few off-chip components can be tolerated in implantable devices or small scientific instruments. I will present custom integrated circuits developed for a wide variety of state-of-the-art neural recording applications, including interfaces for high density silicon microelectrode arrays and tiny wireless telemetry systems for observing brain activity in flying insects.

Biography: Reid Harrison received the BS degree in electrical engineering from the University of Florida in 1994 and the PhD degree from the California Institute of Technology in 2000. He joined the University of Utah in 2000, where was an Associate Professor of Electrical and Computer Engineering and an Adjunct Associate Professor of Bioengineering through 2010. In 2003, he founded Intan Technologies, LLC and joined the company full time in 2010 in Los Angeles. His research interests include low-power analog and mixed-signal CMOS circuit design; integrated electronics for neural interfaces and other biomedical devices; and hardware for biologically inspired computational systems. Dr. Harrison has served on the technical program committees of the International Solid-State Circuits Conference (ISSCC) and the International Symposium on Circuits and Systems (ISCAS).