

EDUCATION

- University of Cambridge, England 1985
Ph. D., Neurobiology
- University of Cambridge, England 1981
B.A. (Honors), Natural Sciences (Zoology)

TEACHING EXPERIENCE

- Associate Professor.** Department of Biology, Point Loma Nazarene University, San Diego, CA. 2006-
- Adjunct Professor.** Department of Biology, Point Loma Nazarene University, San Diego, CA. 2005-2006
- Visiting Associate Professor.** Department of Biology, Point Loma Nazarene University, San Diego, CA. 2003-2005
- Lecturer.** Division of Biological Sciences, University of California San Diego, La Jolla, CA. 1998-2003

TEACHING INTERESTS

Human anatomy and physiology
Human biology and bioethics
Freshwater ecology
Insect biology
Cellular and comparative physiology

RESEARCH EXPERIENCE

- Assistant, then Associate Project Scientist.** Division of Biological Sciences and Institute for Nonlinear Science, UC San Diego. 1991-2003

POST-DOCTORAL STUDIES

- Visiting Postgraduate Researcher.** Division of Biological Sciences, UC San Diego. 1988-1991
- Postdoctoral Fellow.** Department of Physiology, University of Bristol, England. 1985-1988

RESEARCH INTERESTS

How do the cellular properties and synaptic interactions of neurons cooperate to allow neural circuits to function in behavior?

How does the development of intrinsic neuronal phenotype, such as ion channel and neurotransmitter expression, correlate with the maturation of neuronal function and behavior?

To address these questions, I study the nervous systems of arthropods such as insects and crustaceans. Compared with mammals, arthropods have substantially fewer neurons but still perform sophisticated behavior. Many of their neurons can be recognized as unique, identified individuals, and related to neural circuits and behavior. Moreover, in arthropods, the central nervous system is compartmentalized into ganglia that control different body segments and functions. The neurons studied are important in the control of feeding behavior, breathing movements, and locomotion.

Students pursue original projects investigating specific aspects of these broad questions. Projects may include studying behavior, making neural recordings, analyzing time-series, staining for ion channels and neurotransmitters using immunocytochemistry.

RESEARCH GRANT

National Science Foundation

1999-2002

The role of chaotic dynamics in motor pattern generation. (IBN-9975490; \$360k). Co-P.I.: Dr. P.F. Rowat, Institute for Neural Computation, UC San Diego.

RECENT PUBLICATIONS

P.F. Rowat and R.C. Elson (2004). State-dependent effects of Na channel noise on neuronal burst generation. *Journal of Computational Neuroscience* 16: 87-112.

R.C. Elson, A.I. Selverston, H.D.I. Abarbanel, and M.I. Rabinovich (2002). Inhibitory synchronization of bursting in biological neurons: dependence on synaptic time constant. *Journal of Neurophysiology* 88: 1166-76.

R.D. Pinto, R.C. Elson, A. Szucs, M.I. Rabinovich, A.I. Selverston, and H.D.I. Abarbanel (2001). Extended dynamic clamp: controlling up to four neurons using a single desktop computer and interface. *Journal of Neuroscience Methods* 108: 39-48.

A.I. Selverston, M.I. Rabinovich, H.D.I. Abarbanel, R.C. Elson, A. Szucs, R.D. Pinto, R. Huerta and P. Varona (2000). Reliable circuits from irregular neurons: A dynamical approach to understanding central pattern generators. *Journal of Physiology (Paris)* 94: 357-374.

R.C. Elson, R. Huerta, H.D.I. Abarbanel, M.I. Rabinovich, and A.I. Selverston (1999). Dynamical control of irregular bursting in an identified neuron of an oscillatory circuit. *Journal of Neurophysiology* 82: 115-122.