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Neurodatabase Construction Kit I: Software Tools for Biophysical Data Sharing

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Biophysical data increasingly benefit from being archived and shared, aiding reanalysis. Such sharing needs software to manage submission, annotation, storage, search, delivery, and analysis. Specialized biomedical data often require custom databases and midlayers, and query and presentation tools, as well as specific yet standard terminology. However, such design frequently entails resources beyond many labs or groups. To serve neuroscience and biophysics, we are designing a Neurodatabase Construction Kit that will when complete generate needed software from a standard data description. We now report the first component.

Our neurodatabase Java user tools (Robert et al *Biophys. J.* 2004) are now dynamically generated and configured without custom programming. Appropriate data structures are specified in a declarative format; the tools then configure themselves to properly store this structure and manage user interaction. So that the declarative format requires no programming knowledge and supports reuse of data structures we have utilized our BrainML XML Schema-based data representation language (Gardner et al *Biophys. J.* 2003). BrainML includes BrainMetaL, a set of general components for structured numeric data, units of measure, and bibliographic references, together with an initial model specifying cortical neurophysiology. Brainml.org now presents a model repository additionally supporting public submission of data models. Database schema and panels for the repository based on the cortical neurophysiology brainml.org model may be accessed at neurodatabase.org.

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