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## A Protocol for 3D Reconstructions from Reduced-quality Serial Histological Sections

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## **Marshall McDaniel**

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### **A Protocol for 3D Reconstructions from Reduced-quality Serial Histological Sections**

Computer-generated 3D reconstructions of anatomy allow the examination of minute and internal structures that cannot be visualized using traditional methods. Digital reconstructions are generated from many sources, including magnetic resonance imaging, computed tomography, and histological serial sections. Of these, serial sections provide the most information, but are difficult to generate because of deformation and misalignment. Protocols to eliminate inconsistencies in a serial section stack could result in informative reconstructions generated efficiently and inexpensively. I describe a protocol I developed to construct 3D visualizations from reduced-quality serial sections. Using this technique, I created a reconstruction of the vertebral column of the spadefoot toad (*Spea bombifrons*), a species for which the vertebral column has unique morphology and developmental patterns. Results presented here should: 1) provide better methods for creating 3D reconstructions from serial sections, and 2) offer new insights for future studies of the development of the spinal column of *S. bombifrons*.

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*Marshall McDaniel is a senior pursuing his Bachelor's of Arts in Biological Sciences. He has conducted research with Dr. Maglia since his freshman year in college. He has also been involved in Opportunities of Undergraduate Research Experiences (OURE) for the past two years. Marshall enjoys being a part of this program, because it provides an easy way for students and professors to learn from one another and have fun doing it.*