

**The New England Botanical Club  
Graduate Student Research Award  
2020 AWARD WINNER**

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**The effects of stelar architecture on hydraulic  
integration in fern rhizomes**

One of the most important innovations in land plant evolution was the development of a water transport system, known as the stele. This innovation aided in structural support, and amplified water flow allowing for plants to grow larger, increase their total photosynthetic capacity, and eventually become dominant on earth. The 3-dimensional architecture of the stele through the stem is known as stelar architecture. Compared with any other lineage of vascular plants the stelar architecture in ferns is most diverse, and this diversity has interested botanists for over 200 years. But, one important aspect of stelar architecture that has not been resolved is the functional significance of all this diversity. Does stelar architecture have any physiological implication? In angiosperms, branching and vascular architecture affects water movement through the stem. From these studies, some analogies may be made regarding how stelar architecture affects water movement across the rhizome in ferns. As part of this NEBC funded research, I will use five New England fern species—that possess stelar architectures that span the total diversity—to investigate how stelar architecture affects water movement through the rhizome. Specifically, how hydraulically interconnected are ferns across their rhizome and do the different stelar architectures affect water movement through nodes and internodes. This work will help illuminate the evolution and functional implications of the diversity of stelar architecture in ferns.

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The New England Botanical Club offers awards of up to \$3,000 to graduate students to support botanical research. The awards encourage and support botanical research on the New England flora (plants, algae, and fungi), including support for field, lab, and herbarium work, as well as travel to New England by those who would not otherwise be able to work in the region. The awards are made to the graduate student(s) submitting the best research proposal dealing with systematic botany, plant ecology, genetics, plant conservation biology, or related fields pertaining to the New England flora.