BICMEE2020 Workshop: Bio-Inspired Computing for Miniaturization and Energy Efficiency

Local Organizers:
Brian Smith (SOLS), Jon Harrison (SOLS), Theodore Pavlic (CIDSE), and Kevin Cao (SECEE)

On **February 28, 2020**, ASU biologists and engineers will host experts both from ASU and from elsewhere to discuss how to advance the state of the art in miniaturized computing by making use of insights from the neuroscience of miniaturization in biology.

Location

Goldwater Center (GWC), Room 487
650 E. Tyler Mall
Tempe, AZ 8528
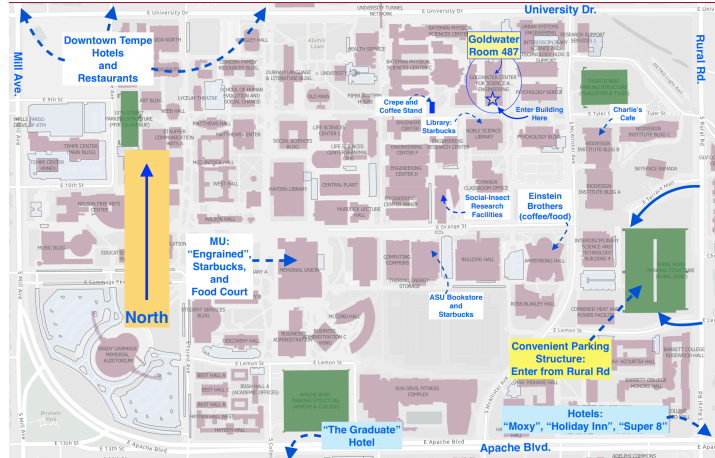
Workshop Agenda (see website for precise breakdown of talks)

8:30–9 am: Opening Remarks

9–10:00 am: Plenary: Sean O'Donnell, Drexel University (Professor, Interim Department Head)

> *Title:* **Brain–body allometry: are brains an evolutionary wall for small animals?**
> *Abstract: Brain investment-constraints on growth and development are pervasive in animals, and comparative analyses suggest that brain miniaturization is limited in magnitude relative to most other body structures. I will illustrate some basic patterns of brain/body allometry using my own data from social wasps (Vespidae), and I will explore how major ecological shifts can break clade-typical brain/body allometries. Wasp body allometry patterns also suggest that the need to accommodate relatively large brains can impact body plans as smaller body sizes evolve within a lineage; the challenges of brain housing may even set lower limits on body size. I propose that brain/body allometry is an important overlooked factor in the evolutionary ecology of animal body size. I will then review some (bizarre) examples of brain-driven body plan changes in animal lineages pursuing extreme miniaturization, and I will discuss some of the physiological and cellular limits on the size reduction of brain themselves.*

10–10:20 am: Coffee break

10:40–12:00 pm: *Session:* Biological case studies in miniaturization

12:00-1:00pm: **LUNCH** *(not provided)*

1–2:20pm: *Session:* Computational modeling

2:20–2:40 pm: Coffee break

2:40–4:00pm: *Session:* Neuromorphic computing