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Evolutionary Ecology

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FELLOWSHIP

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# Multi-Level Spatiotemporal Dynamics in Animal Networks

Social interactions are fundamentally embedded in their spatial context. Study of animal social networks has yielded intriguing insights into the structure and function of animal societies, allowing us to characterize the diversity of social systems quantitatively and qualitatively and to pose novel questions about their evolutionary origin. However, so far our understanding has progressed relatively divorced from spatial considerations, treating networks as essentially scale-free objects. I would like to explore the interface between ecology and social structure, asking how contact networks in various animal species might be dynamically shaped by their environment. Using the spatio-temporal coordinates of individuals to construct contact networks, it is possible both to distinguish different types of relationships and to explore how an underlying substrate - i.e., resource structure - drives these relationships. Such spatially-derived networks can refine our understanding of how dynamic processes act on such networks, such as pathogen and information transfer. I would like to build collaborations uniting the study of animal sociality with novel network-modeling techniques that will likewise stimulate different ways of thinking about how networks operate and influence behavior.

I am also interested in how such contact networks, especially in social species, affect survival and reproduction, hence their relevance for conservation. In an era in which global changes and human activities pose threats even to once-abundant species, it is vitally important to understand how individuals as well as ecosystems respond to modifications of basic contact networks. However, characterizing changes to networks and testing predictions in statistically and biologically meaningful ways remains challenging. I would like to investigate how spatial approaches could be used to overcome this. During this period, I will also be collaborating on a book on elephant behavior and conservation.

## Recommended Reading

de Silva, S., A. Ranjeewa, and S. Kryazhimskiy (2011). "The dynamics of social networks among female Asian elephants." *BMC Ecology* 11, 17.

doi: 10.1186/1472-6785-11-17

de Silva, S. and G. Wittemyer (2012). "A comparison of social organization in Asian elephants and African savannah elephants." *International Journal of Primatology* 33, 5: 1125-1141.

doi: 10.1007/s10764-011-9564-1

de Silva, S., L. Webber, U. S. Weerathunga, T. V. Kumara, D. K. Weerakoon, and G. Wittemyer (2013). "Demographic variables for wild Asian elephants using longitudinal observations." *PLoS One* 8, 12.

doi: 10.1371/journal.pone.0082788)

De Silva, Shermin (2016)

Need for longitudinal studies of Asian wildlife in the face of crises

<https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=870767623>

De Silva, Shermin (Oxford,2016)

Fission–fusion processes weaken dominance networks of female Asian elephants in a productive habitat

<https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=870761005>

De Silva, Shermin (Washington, DC,2014)

Supporting the scientific diaspora

<https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1769924973>

De Silva, Shermin (S.I.,2014)

Sri Lanka : elephant island /Martyn Colbeck ; Shermin de Silva

<https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=815862016>

BBC Natural World

<https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=815862016>