

---

# Applied Mathematics Seminar

---



## Hassan Alkhayuon

School of Mathematical Sciences, University College Cork

### Phase tipping: How cyclic ecosystems respond to contemporary climate

We examine how contemporary climate induces tipping to extinction from predator-prey population cycles. The study reveals a counter-intuitive behaviour, which we call phase tipping (or P-tipping), where the stable cycle persists, yet transitions to extinction occur from certain cycle phases. To explain this behaviour, we combine global dynamics with set theory and introduce the concept of partial basin instability for limit cycles. This concept provides a general framework to analyse and identify easily testable criteria for the occurrence of P-tipping in externally forced systems.

This is joint work with Rebecca C. Tyson (University of British Columbia Okanagan) and Sebastian Wiczorek (University College Cork).

---

**Wednesday, 03.11.2021 · 16:00 online · WGB G08**  
**Contact Philipp Hoevel ([philipp.hoevel@ucc.ie](mailto:philipp.hoevel@ucc.ie)) for details**  
**University College Cork · Western Road · Cork · T12 XF62**