

Final Report

Name of BritInn Fellow: Katherine Kwa

Home Department: Civil Maritime and Environmental Engineering **Home University:** University of Southampton

Guest Department: Unit of Geotechnical Engineering
Southampton

Guest University: University of

From: 15/05/2023 **Until:** 19/05/2023

Title of the Research Project: Applying hypoplasticity to whole-life geotechnics

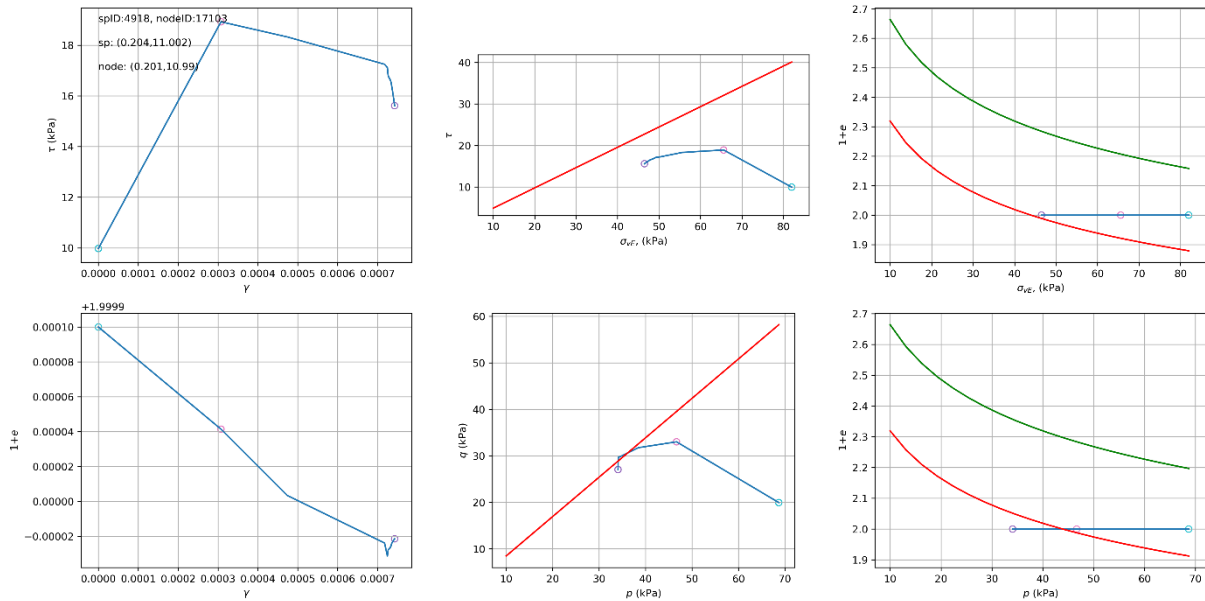
Report about visit and future plans (max. 200 words, English):

During the visit, we continued our collaboration that recently resulted in a journal paper published and another paper submitted to Geotechnique Letters that is currently under review. Our collaboration focuses on using the Hypoplastic constitutive model to capture the changing capacity of embedded anchoring systems for floating offshore renewable energy infrastructure. The collaboration combines two numerical approaches to solve this problem; at an element scale in Matlab and as a boundary value problem in Plaxis 2D (Figure 1).

During the visit, we discussed the design of our numerical models, and benchmarked them to check consistency. We also planned the new workflow between the numerical models for future simulations. Gertraud Medicus is an expert in Hypoplasticity. It is a pleasure to work with her and learn more about using Hypoplasticity for offshore geotechnical applications. The guest lecture took place in-person on Tuesday 16/05 (Figure 2), attracting about 15 viewers who participated in an excellent Q&A discussion afterwards.

Our future plan is to create 2D-maps of changing soil strength around an anchor to capture the evolving soil response and anchor capacity. We plan that this will lead to another a journal paper. After two years of collaborating virtually with Gertraud, it was nice and more productive to meet and discuss in person. Thank you, BritInn Network, for funding my stay in Innsbruck.

Picture Credits:



(a)

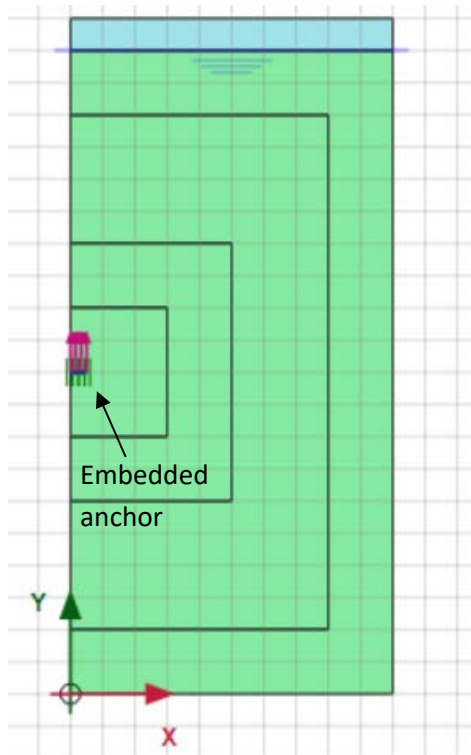
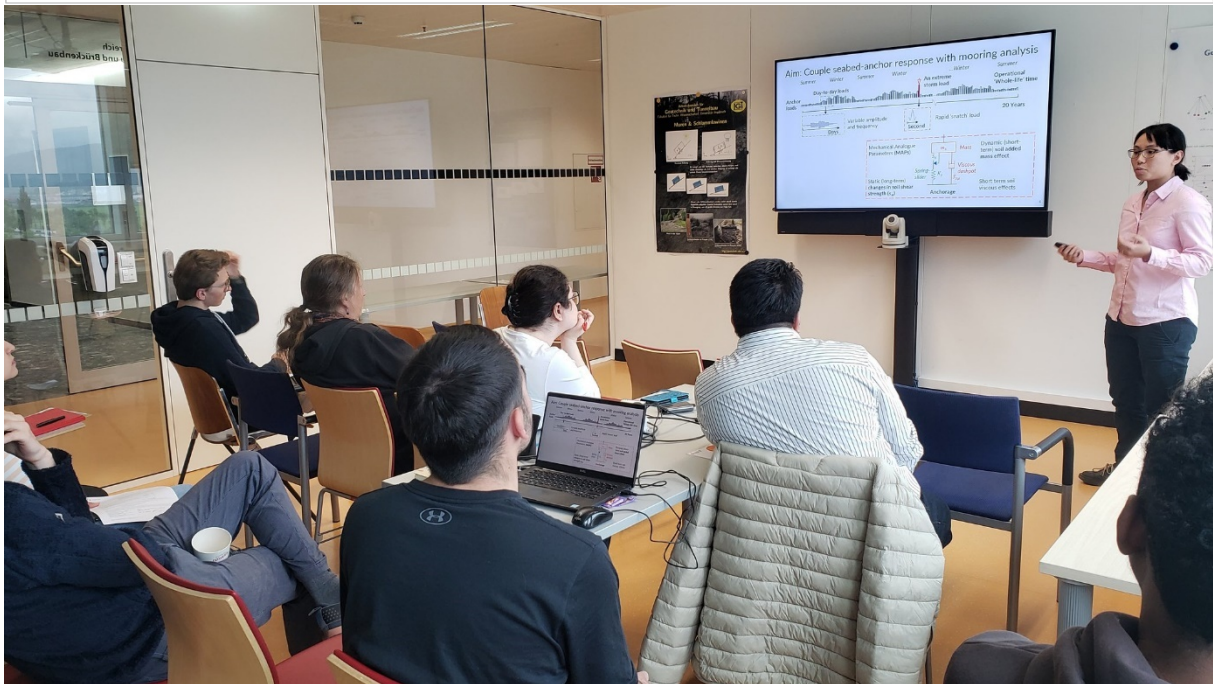


Figure 1: Numerical models which implement Hypoplasticity for offshore geotechnical applications (a) at element scale for a single node and (b) as a boundary value problem



A whole-life macro-model of anchor capacity for floating offshore renewable energy systems

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Figure 2: Invited lecture with title slide.