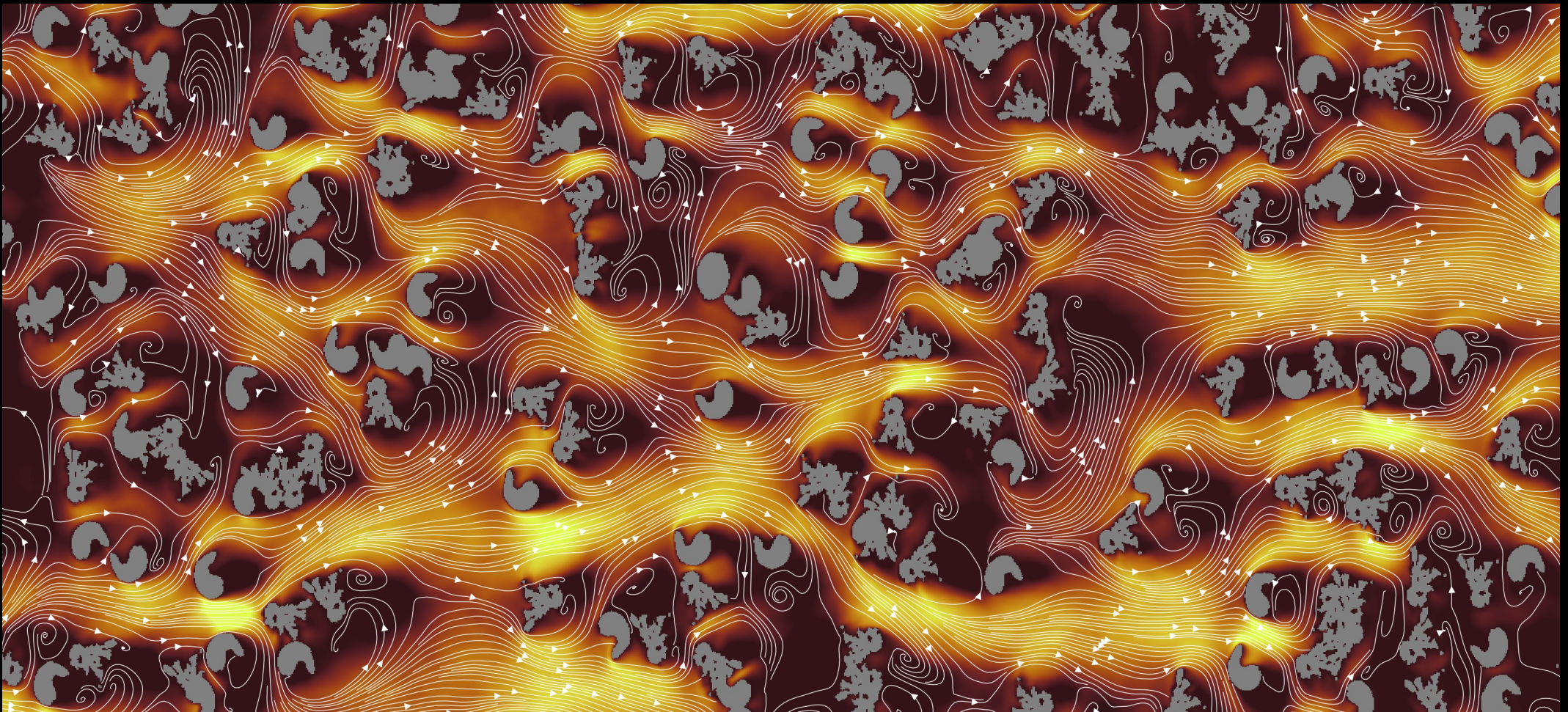




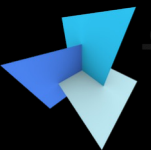
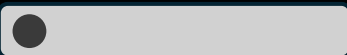
↑
Website

Should we care about the spatial heterogeneity in coral reefs?



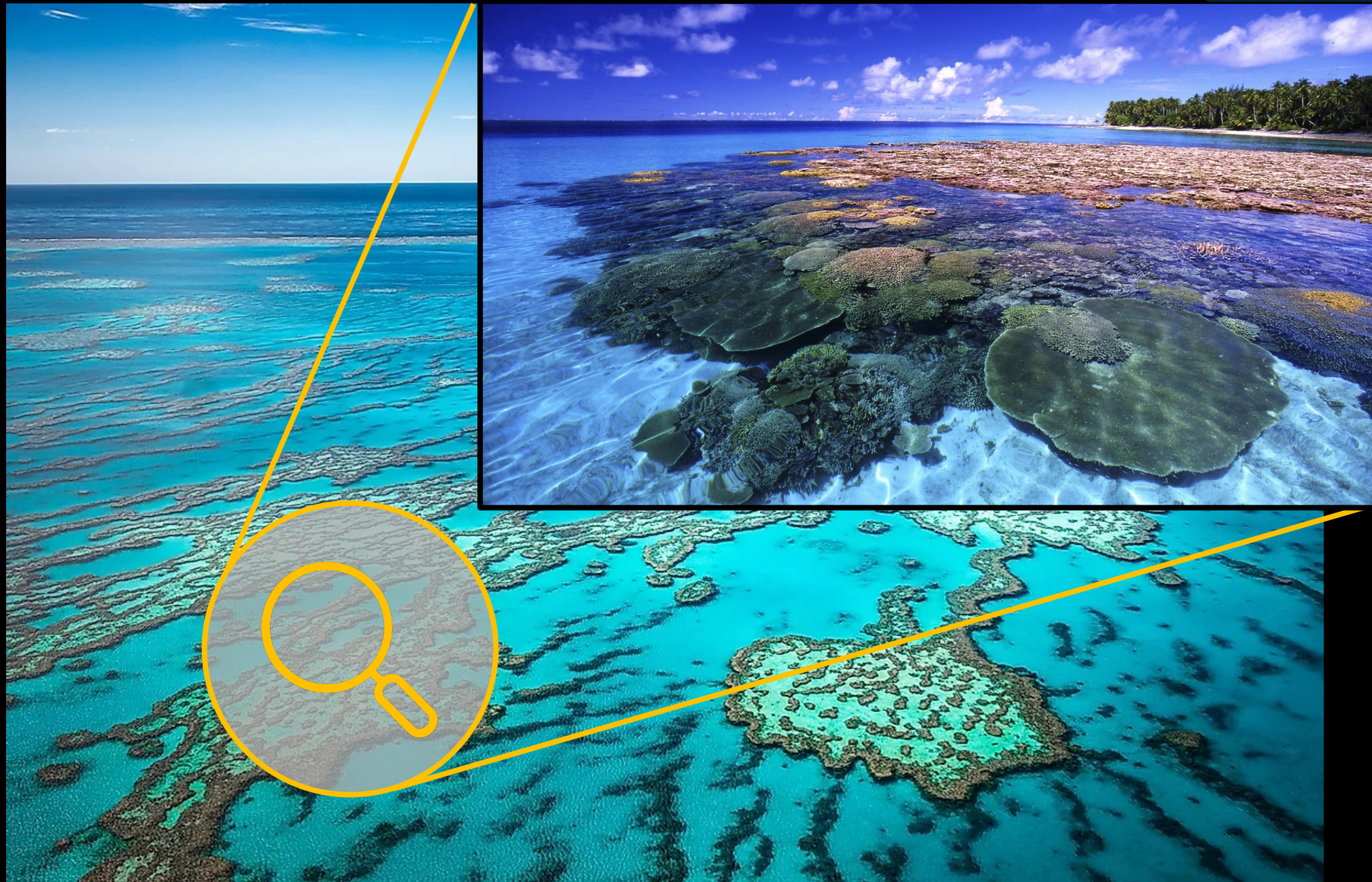
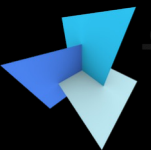
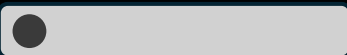


Should we care about the spatial heterogeneity in coral reefs?



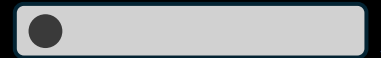


Should we care about the spatial heterogeneity in coral reefs?





Should we care about the spatial heterogeneity in coral reefs?

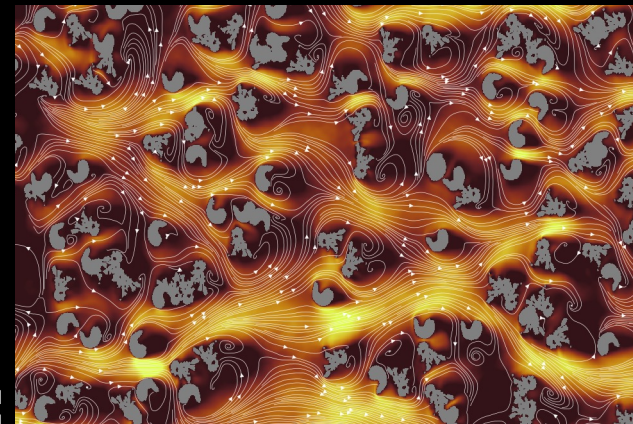
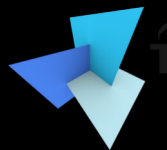
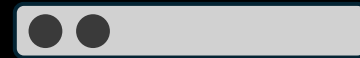


We are doing nasty things to the coastal ocean!





Should we care about the spatial heterogeneity in coral reefs?



CORALS

All ~~characters~~ appearing in this work are fictitious. Any resemblance to real ~~persons~~,
living or dead, is purely coincidental.

CORALS

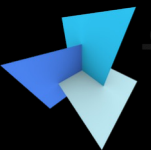
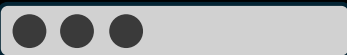


Bucket of Salt!



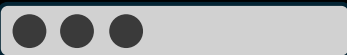


Should we care about the spatial heterogeneity in coral reefs?





Should we care about the spatial heterogeneity in coral reefs?

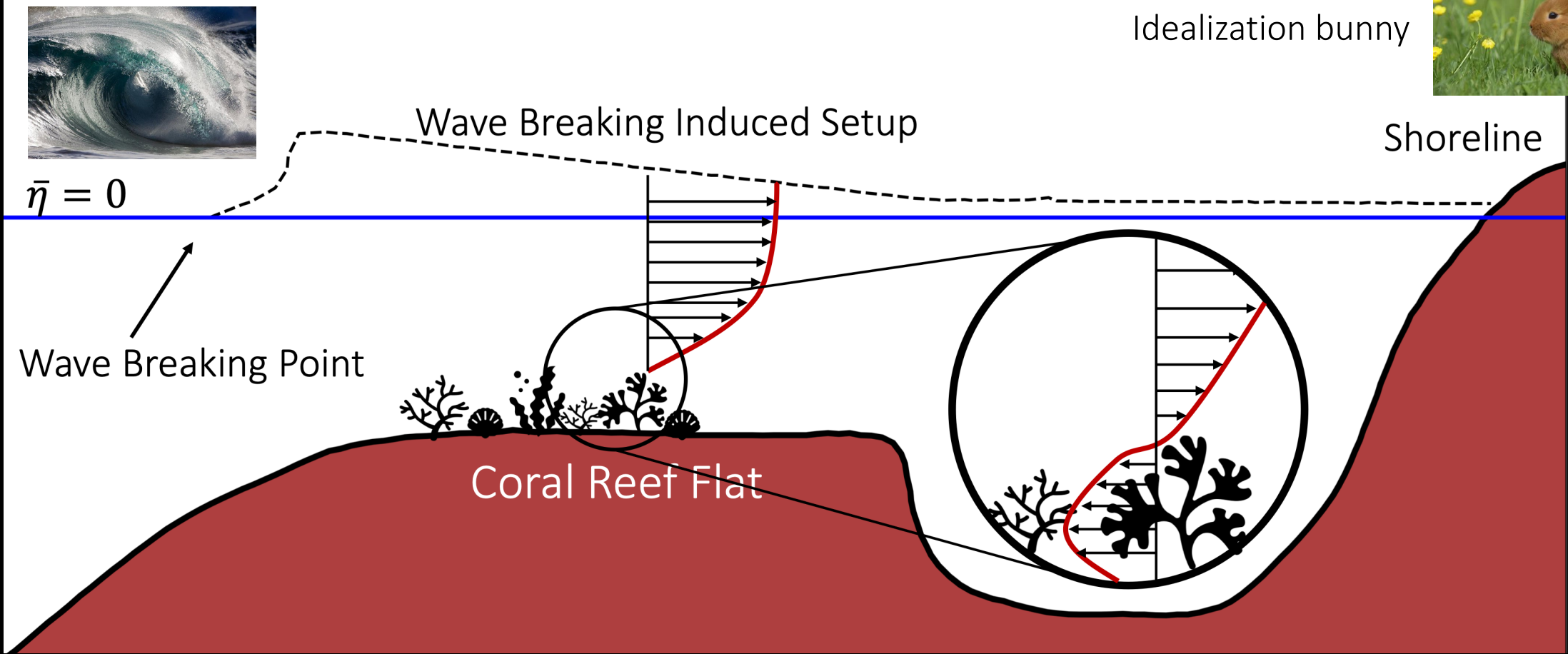


Patil. A. (2019) – MSc thesis



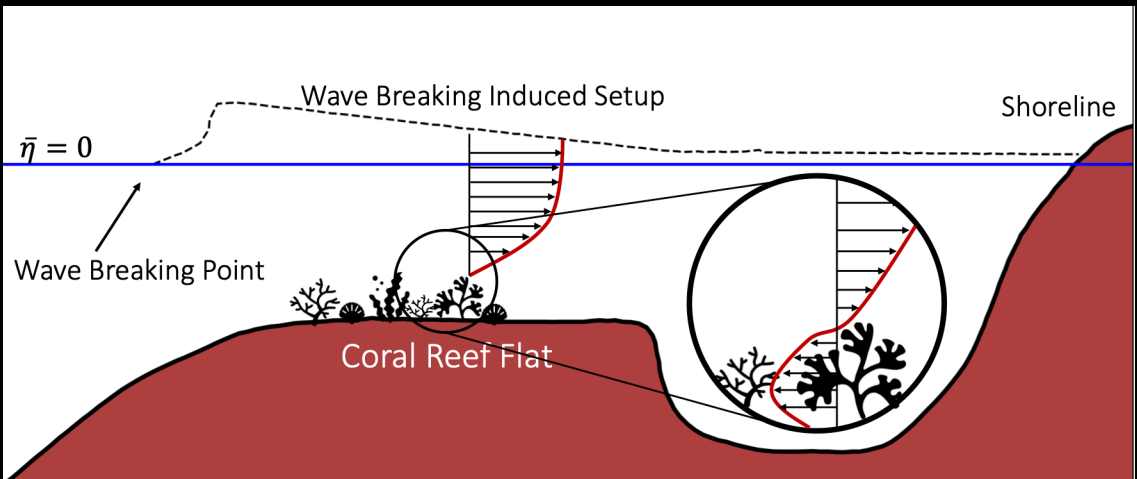
Idealization bunny

Shoreline





Should we care about the spatial heterogeneity in coral reefs?



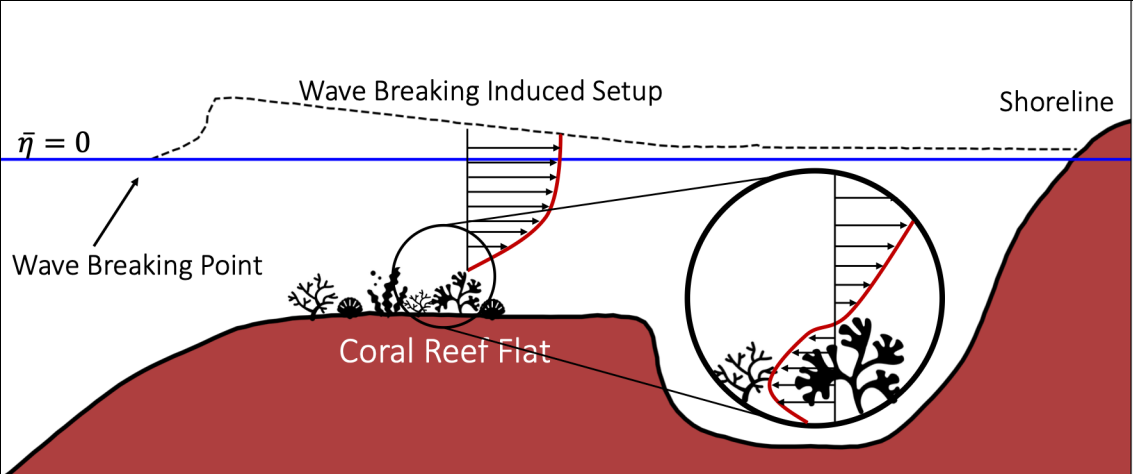
$$\partial_t u_i + \partial_j u_j u_i = -\frac{1}{\rho_o} \partial_i p + \nu \partial_j \partial_j u_i + F(t)$$



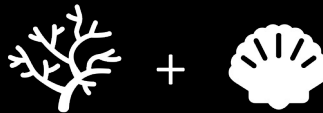
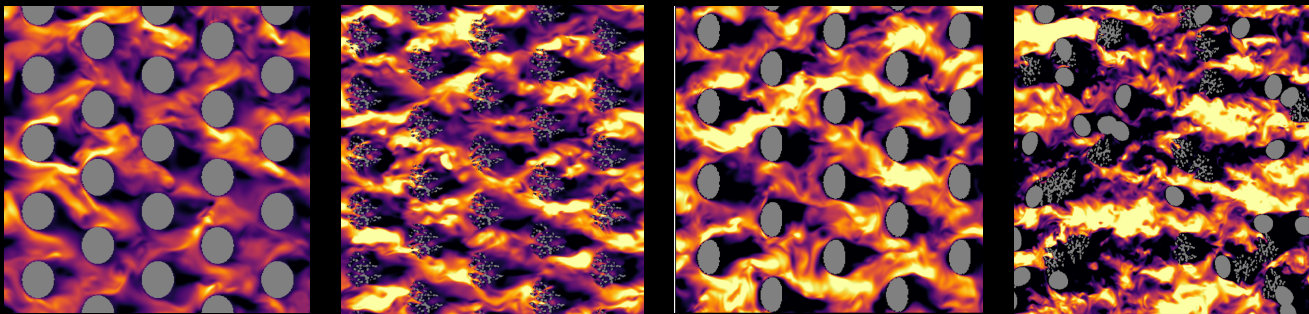
Should we care about the spatial heterogeneity in coral reefs?



Geometric Complexity Increases



$$\partial_t u_i + \partial_j u_j u_i = -\frac{1}{\rho_o} \partial_i p + \nu \partial_j \partial_j u_i + F(t)$$



Constant Pressure Gradient

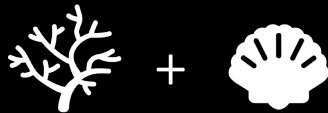
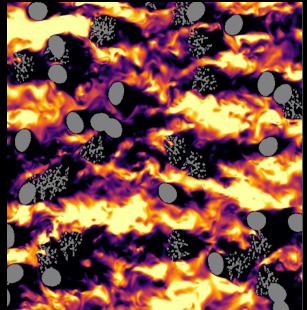
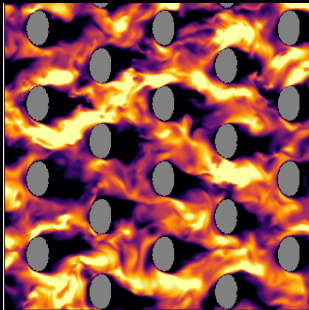
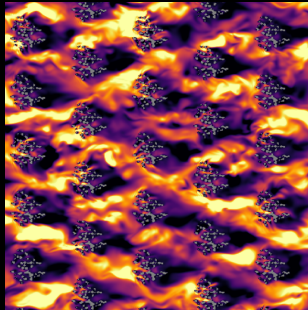
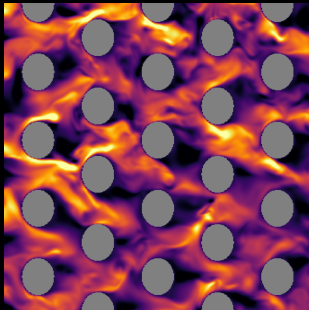
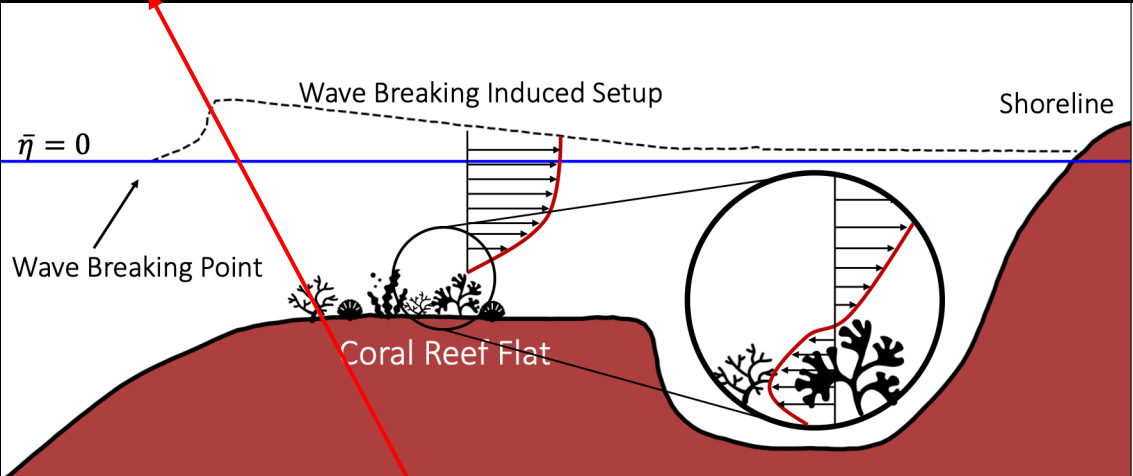
$$F(t) = \Pi_c \delta_{i1}$$



Should we care about the spatial heterogeneity in coral reefs?

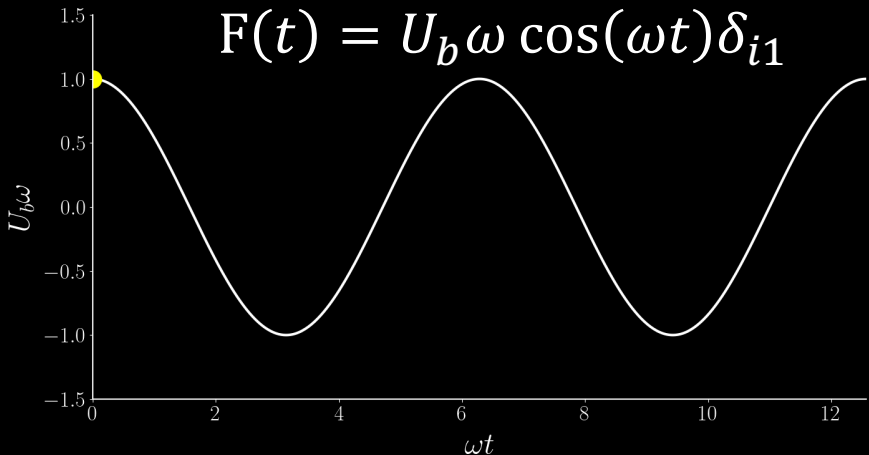


Geometric Complexity Increases



$$\partial_t u_i + \partial_j u_j u_i = -\frac{1}{\rho_o} \partial_i p + \nu \partial_j \partial_j u_i + F(t)$$

$$F(t) = U_b \omega \cos(\omega t) \delta_{i1}$$

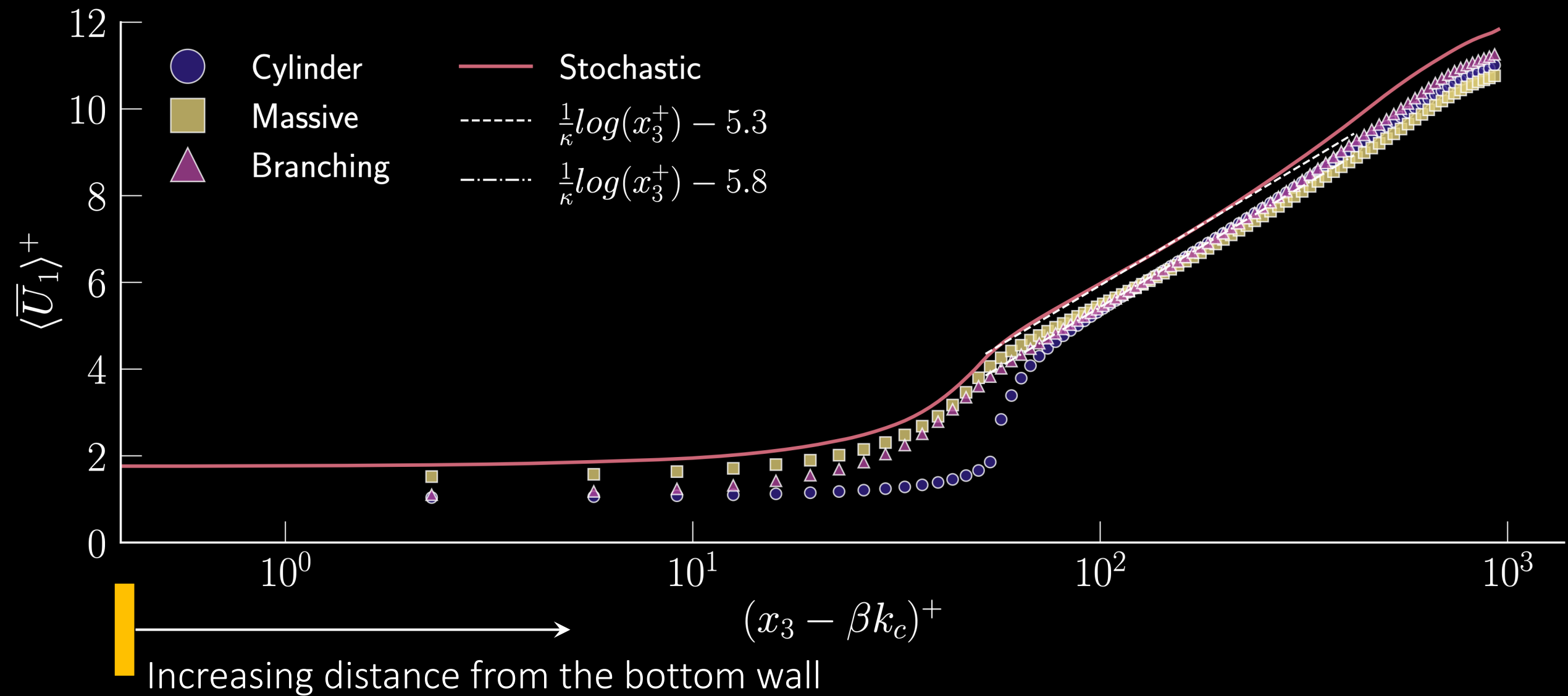
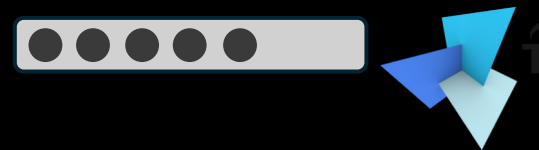


Constant Pressure Gradient

$$F(t) = \Pi_c \delta_{i1}$$



Should we care about the spatial heterogeneity in coral reefs?





Should we care about...

J. Fluid Mech. (2025), vol. 1004, A11, doi:10.1017/jfm.2024.1179

JM PAPERS

On the use of simplified geometries to represent turbulent flow over coral reefs

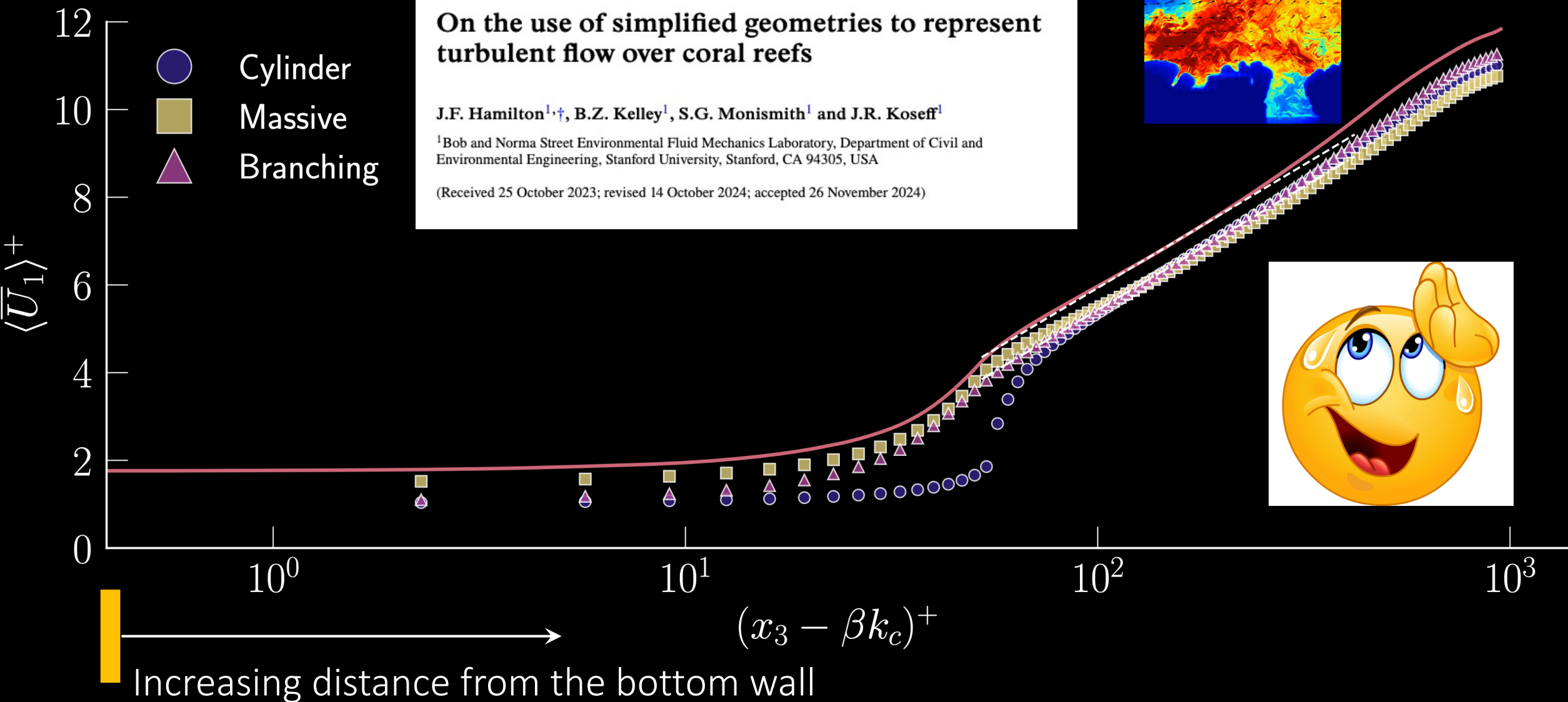
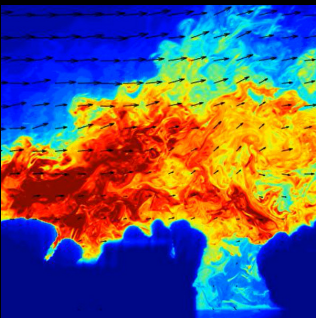
J.F. Hamilton^{1,†}, B.Z. Kelley¹, S.G. Monismith¹ and J.R. Koseff¹

¹Bob and Norma Street Environmental Fluid Mechanics Laboratory, Department of Civil and Environmental Engineering, Stanford University, Stanford, CA 94305, USA

(Received 25 October 2023; revised 14 October 2024; accepted 26 November 2024)

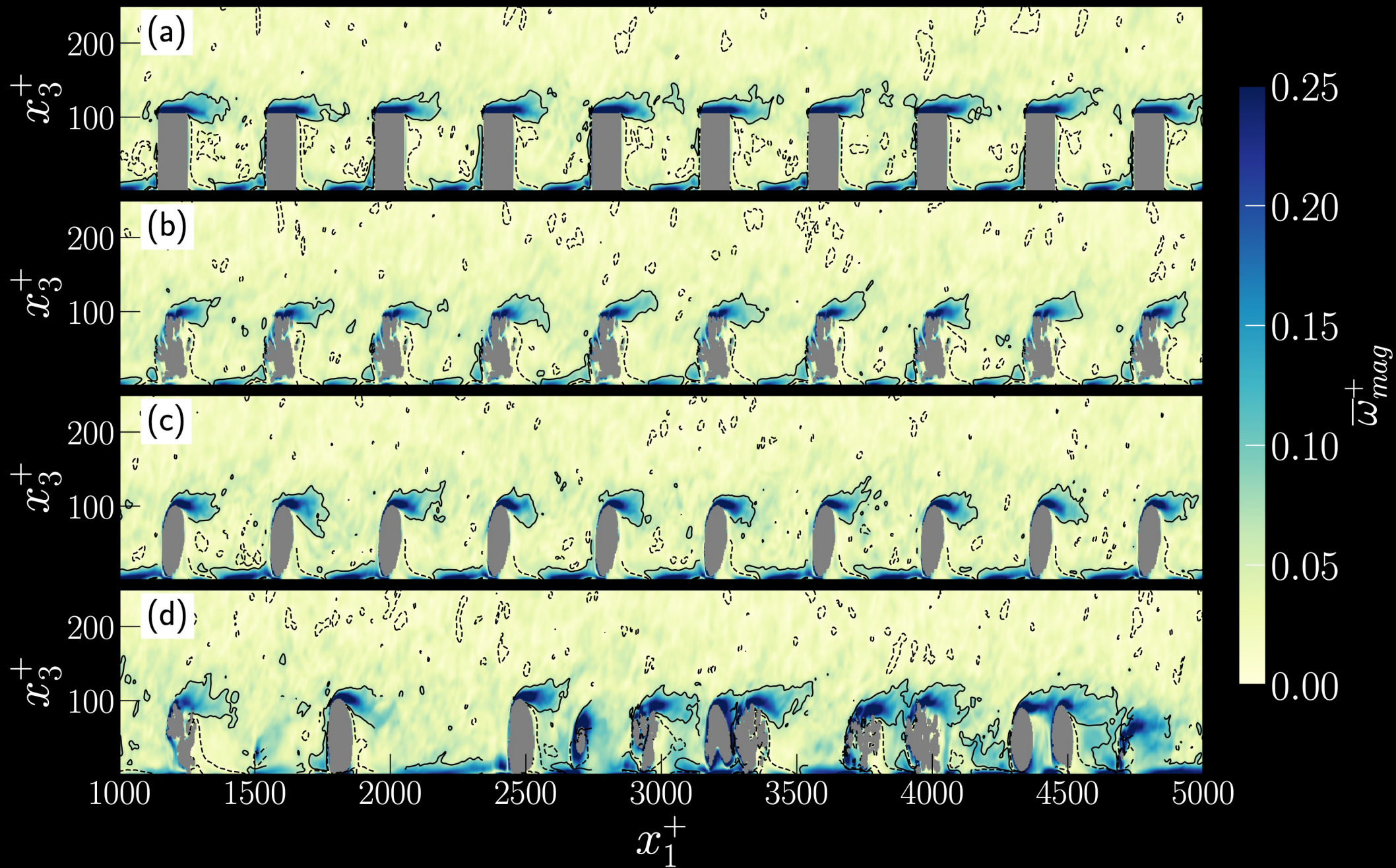
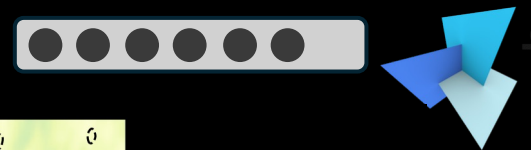


Jenny Hamilton's PhD thesis



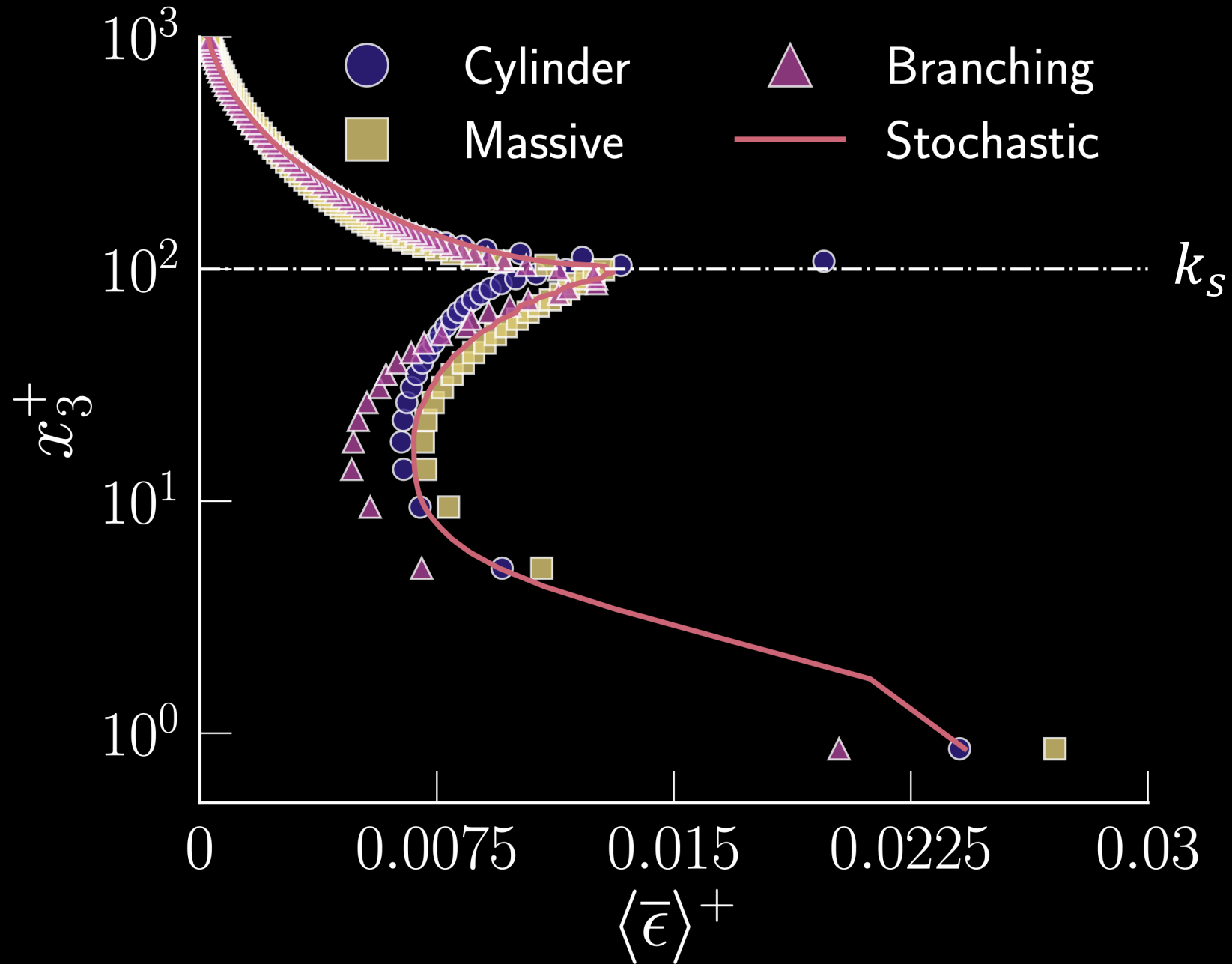
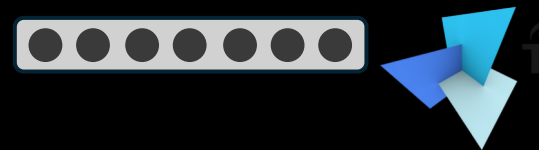


Should we care about the spatial heterogeneity in coral reefs?





Should we care about the spatial heterogeneity in coral reefs?

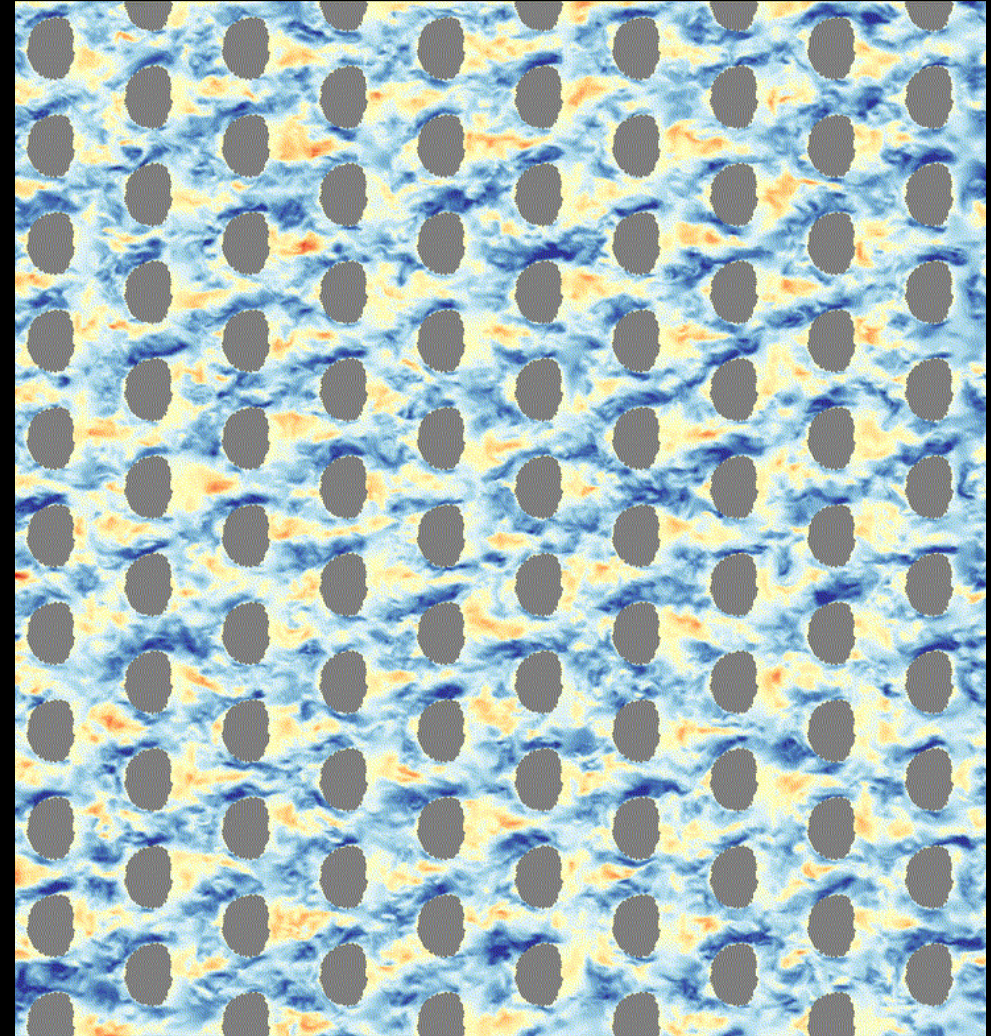




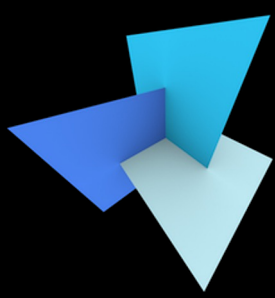
Should we care about the spatial heterogeneity in coral reefs?



- Local processes' heterogeneity matters a lot
 - Nutrient exchange
 - Sediment transport
 - In-canopy dynamics . . .
- Large-scale effects may be less so?



Should we care about the spatial heterogeneity in coral reefs?



Pre-prints & Project



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This work made use of the Dutch national e-infrastructure with the support of the SURF Cooperative supplemented by the Dutch Research Council (NWO) “Multi-fidelity computational modelling of environmental fluid systems” with grant number 2024/ENW/01763969.

