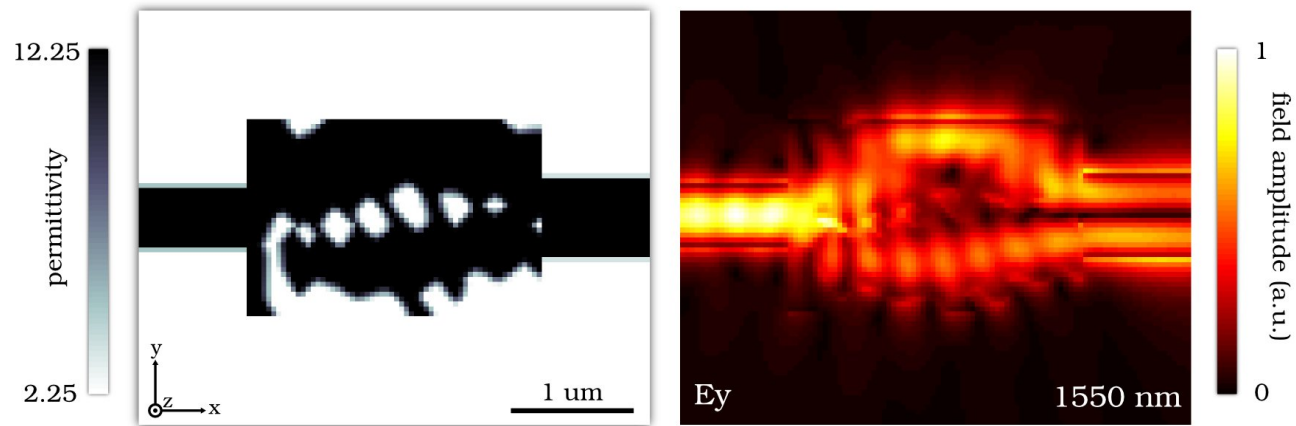# Nanophotonic Computational Design

Jesse Lu
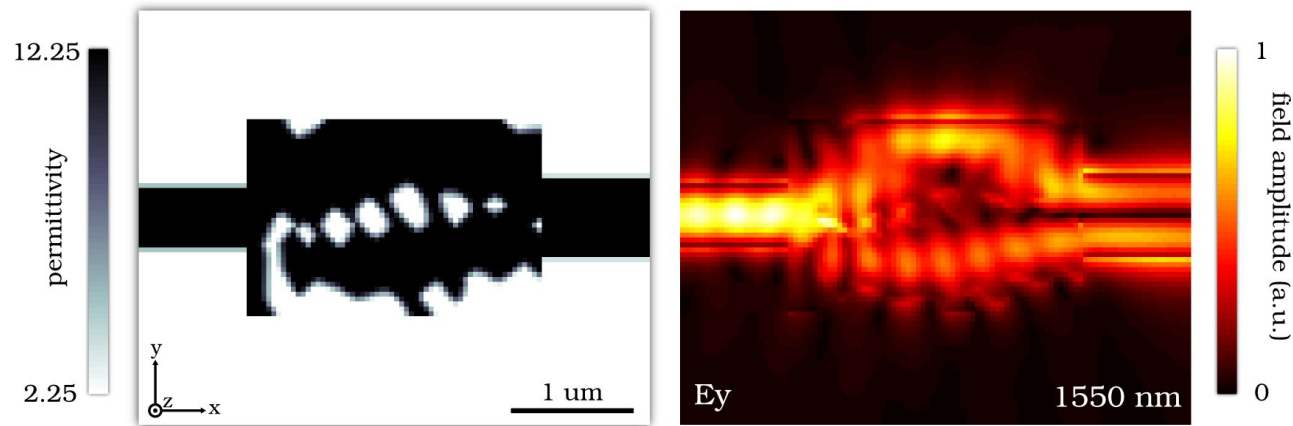
February 25, 2013

Jesse Lu PhD defense, Jelena Vuckovic group, Stanford University

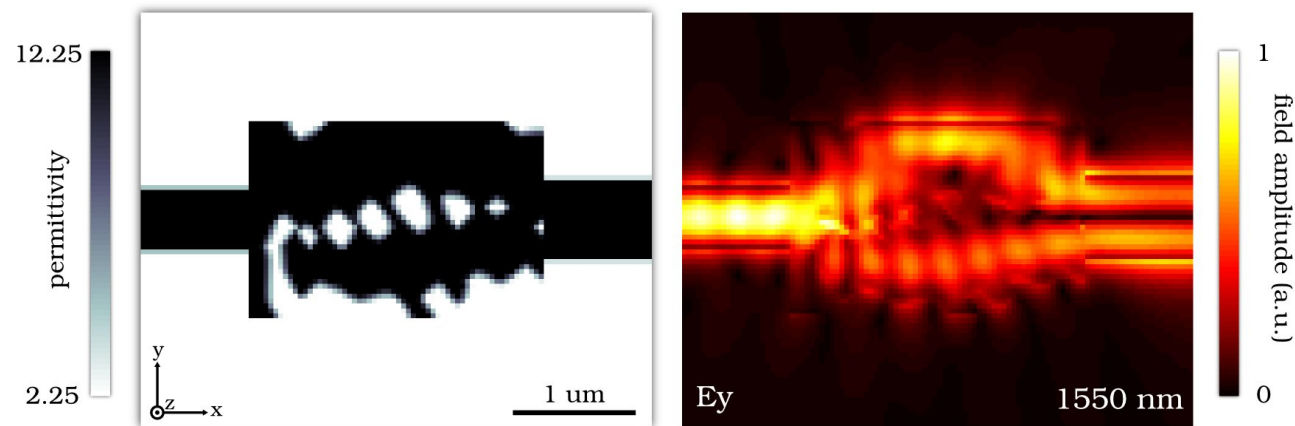# Goal: Show you how to design *any* linear nanophotonic device

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• Physics Advisory:

CONTAINS INVOLVED MATHEMATICAL CONTENT

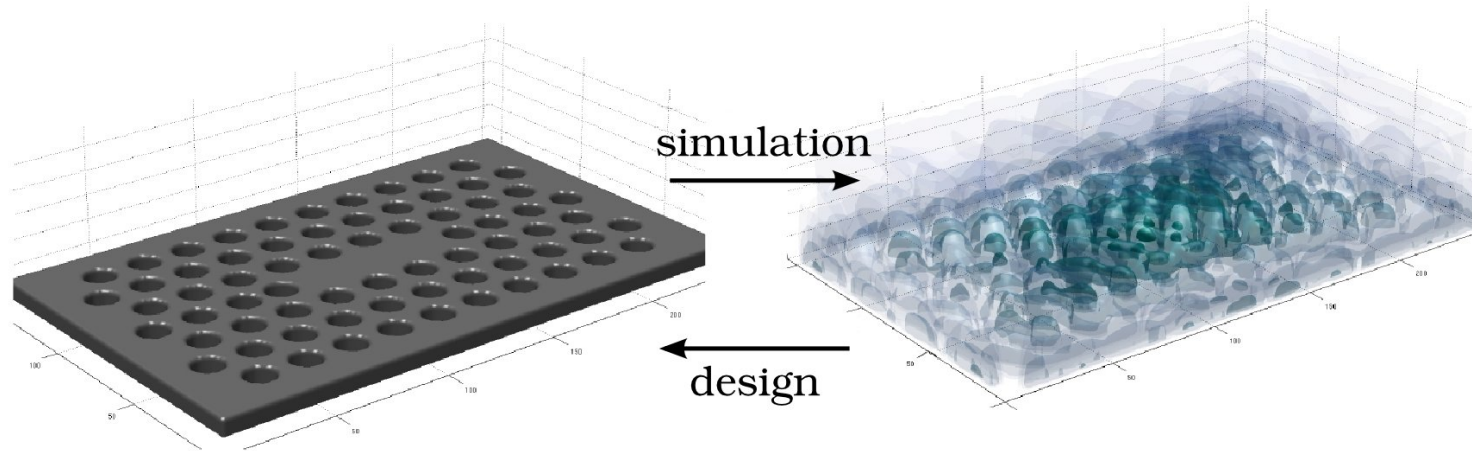Goal: Show you how to design *any* linear nanophotonic device

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- Math Advisory:

  CONTAINS INVOLVED NANOPHOTONIC CONTENT

Given a field, can we find its structure?

- Electromagnetic wave equation (field $\rightarrow E$, structure $\rightarrow \epsilon$)

$$\nabla \times \mu_0^{-1} \nabla \times E - \omega^2 \epsilon E = -i\omega J$$