Mathematical Modelling of Fluid Mechanics.

Abstract: Many PDEs studied by in analysis come from physical problems. One goal of this lecture is to explain where these equations come from and how they are obtained.
Thus, we derive, from first principles, the fundamental equations of fluid mechanics and we consider various constitutive laws (e.g., perfect fluids, viscous fluids, non Newtonian fluids). Various special flows are subsequentlystudied, such as Couette, Poiseuille, creeping flows, gravity and acoustic waves. The emphasize is on modeling, including approximation techniques like small parameter expansions, boundary layer theory, complex variables, etc.