









## Hidden fluid mechanics: Learning velocity and pressure fields from flow visualizations

Maziar Raissi, Alireza Yazdani and George Em Karniadakis

*Science* **367** (6481), 1026-1030.

DOI: 10.1126/science.aaw4741 originally published online January 30, 2020

### Machine-learning fluid flow

Quantifying fluid flow is relevant to disciplines ranging from geophysics to medicine. Flow can be experimentally visualized using, for example, smoke or contrast agents, but extracting velocity and pressure fields from this information is tricky. Raissi *et al.* developed a machine-learning approach to tackle this problem. Their method exploits the knowledge of Navier-Stokes equations, which govern the dynamics of fluid flow in many scientifically relevant situations. The authors illustrate their approach using examples such as blood flow in an aneurysm.

*Science*, this issue p. 1026

#### ARTICLE TOOLS

<http://science.sciencemag.org/content/367/6481/1026>

#### SUPPLEMENTARY MATERIALS

<http://science.sciencemag.org/content/suppl/2020/01/29/science.aaw4741.DC1>

#### RELATED CONTENT

<http://stm.sciencemag.org/content/scitransmed/11/503/eaaw3329.full>

#### REFERENCES

This article cites 25 articles, 4 of which you can access for free  
<http://science.sciencemag.org/content/367/6481/1026#BIBL>

#### PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

---

*Science* (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. The title *Science* is a registered trademark of AAAS.

Copyright © 2020 The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works