

**Cray customers**

**are amazing.**

HPC User Forum – Chris Lindahl, Product Marketing Director, Supercomputing

# Amazing transparency.

University of Illinois at Urbana-Champaign researchers Wendy K. Tam Cho and Yan Liu are restoring fairness to electoral district boundaries.

**CRAY**



An aerial photograph showing a flooded residential area. A large yellow house is surrounded by a yellow ring, indicating it is the focus of the forecast. The surrounding area is covered in snow and ice, with several trees and a smaller red house visible in the background. The water is dark and reflects the surrounding environment.

## Amazing forecasts.

NOAA, NCAR, and NCEP are saving lives and protecting property through accurate and timely flood forecasts

**CRAY**

## Amazing clarity.

Sverre Brandsberg-Dahl and the team at PGS are generating high-resolution 3-D seismic images that more accurately locate oil and gas resources.

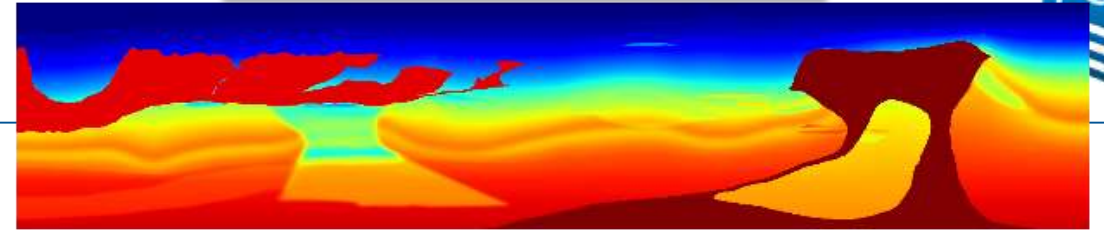
**CRAY**



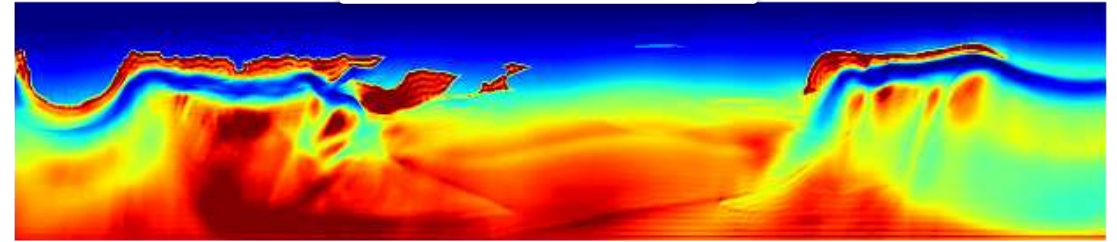
# A Smarter Machine

$$\min_m \left( \underbrace{\|F(m) - d\|^2}_{\text{data misfit}} + \lambda \left( \underbrace{\|Q \nabla(m - m_r)\|_{L^1}}_{\text{weighted TV}} + \underbrace{\int_W P \cdot \nabla(m - m_r)}_{\text{Steerable Variation}} \right) \right)$$

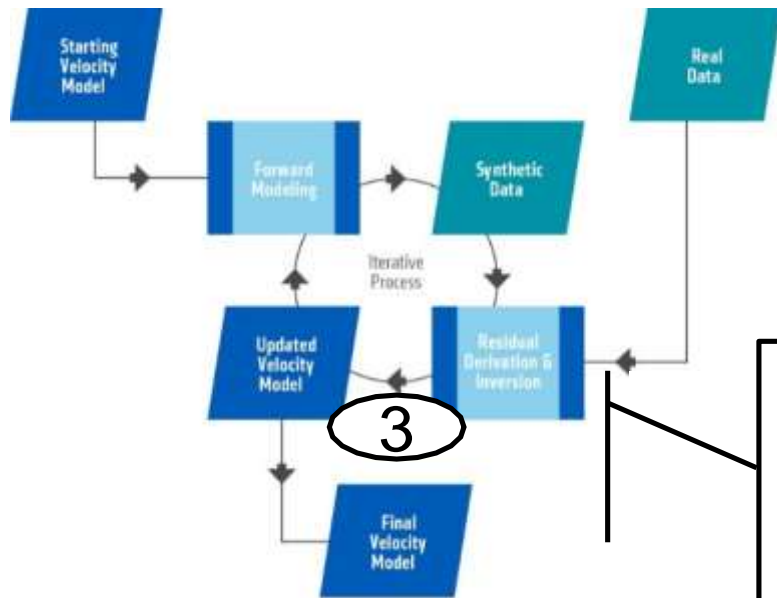
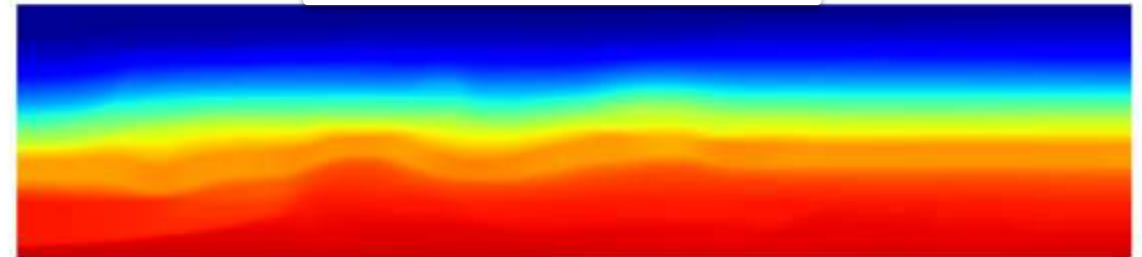
“Ground truth” Benchmark



Conventional FWI



With Machine Learning



**Abel for Machine Learning**  
 A multi-dimensional, ill-posed optimization problem that is far from automated and requires lots of skilled resources' intervention — sometimes more art than science in many cases....  
**Implement state-of-the-art Machine Learning on Abel**

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