From Big Data to Bedside (BD2B):
Translating genomic big data to better clinical care through artificial intelligence

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Address key questions of AI in medicine

• Causality

• Pattern recognition
  – Deep learning
  – Active learning

• Decision theory
Research Themes

- Cancer Pathway Discovery
- Decision support system for personalized medicine
- Machine learning
- Deep learning
- Single-cell omics
- Text mining and knowledge representation

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Signal-Oriented Pathway Analyses Reveal a Signaling Complex as a Synthetic Lethal Target for p53 Mutations

Songjian Lu¹,², Chunjui Cai¹,², Gonghong Yan³,⁴,⁵, Zhuan Zhou³,⁶, Yong Wan³,⁶, Vicky Chen¹,², Lujia Chen¹,², Gregory F. Cooper¹,², Lina M. Obeid⁷, Yusuf A. Hannun⁷, Adrian V. Lee²,³,⁴,⁵, and Xinghua Lu¹,²

A therapeutic strategy that potentially can benefit tens millions of cancer patients.
My Moonshot
DeepRx: AI-driven Precision Oncology

 Integrating multi-omics data (genomic, transcriptomic, and pharmacogenomics)

Advanced AI methodologies: Deep learning, tumor-specific Bayesian causal networks, ...

Infer the activation states of cancer pathways

Predict drug sensitivity based on the activation states of
  • Drug-targeted pathway
  • Circumventing pathways

Recommend Patient-specific regimen

Detect patterns in the disease states of tumors

Omics + EMR