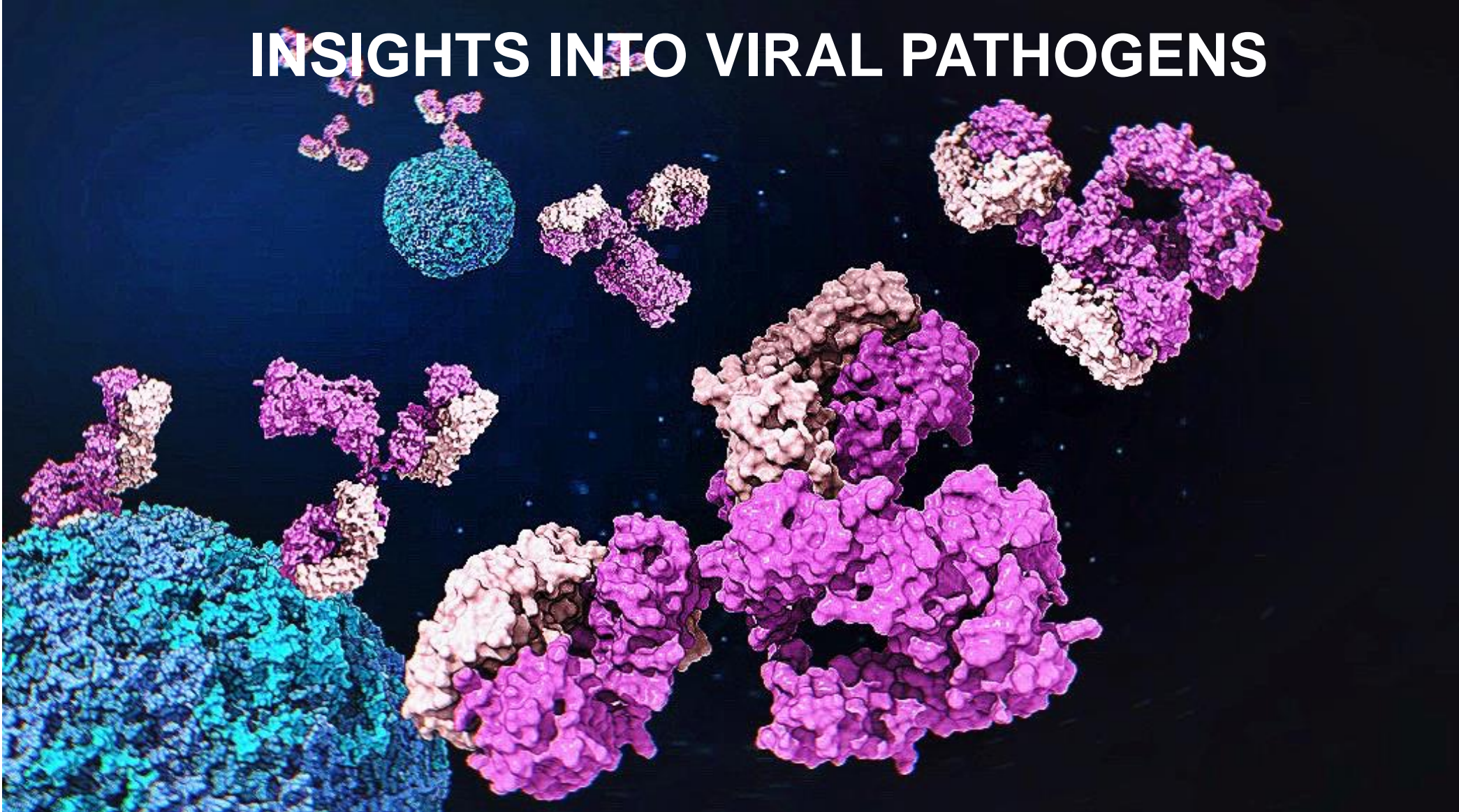


INSIGHTS INTO VIRAL PATHOGENS



Richard J. Kuhn

Trent & Judith Anderson Distinguished Professor of Science

Department of Biological Sciences

Krenicki Family Director, Purdue Institute of Inflammation, Immunology and Infectious Disease



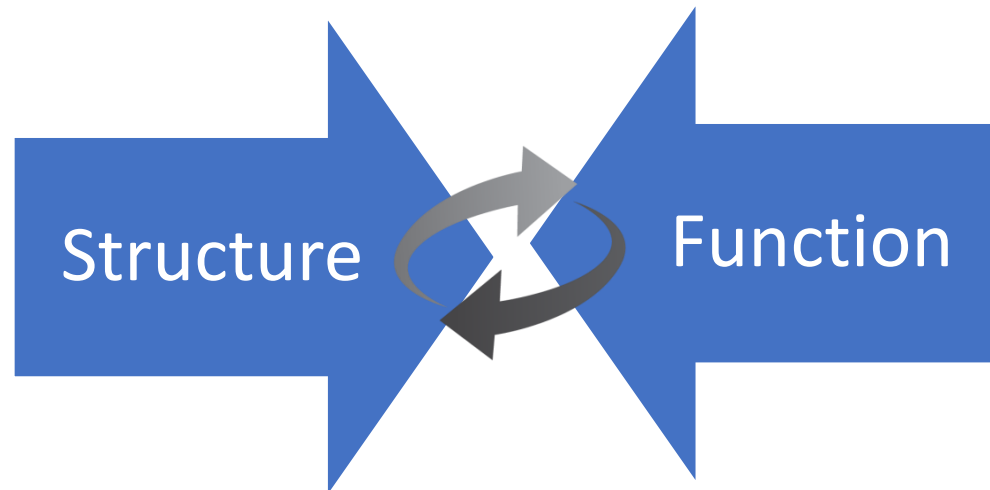
INSIGHTS INTO VIRAL PATHOGENS

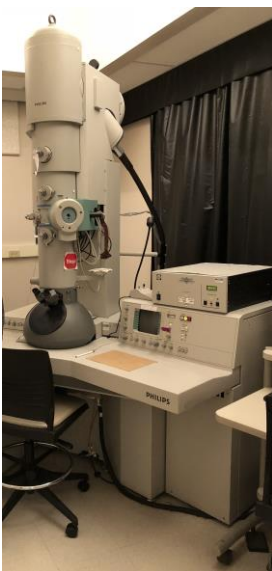
My laboratory investigates viruses that cause human disease.

We utilize many tools in structural biology, biochemistry, genetics, immunology and virology to ask a simple question ->
How does this virus cause disease?

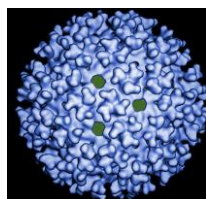
Once we know 'how' we can then turn to developing strategies for prevention.

Structure is the science
of seeing molecules in
their natural positions

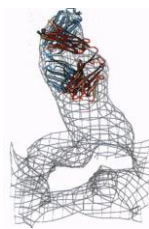




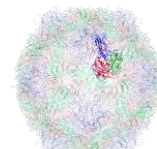
Arrive 1992
CM200



Ross River
virus - 1994

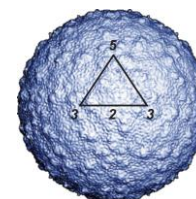


Sindbis virus bound
to antibody - 1995

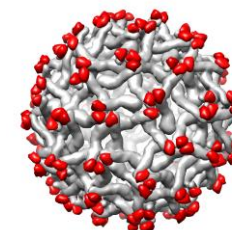


Polio virus bound
to receptor - 1998

Dengue virus
- 2002

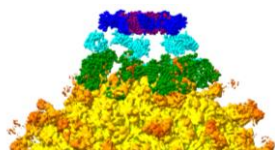


Dengue assembly
intermediates -2006

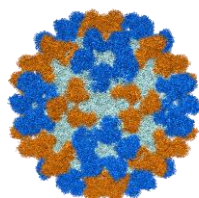
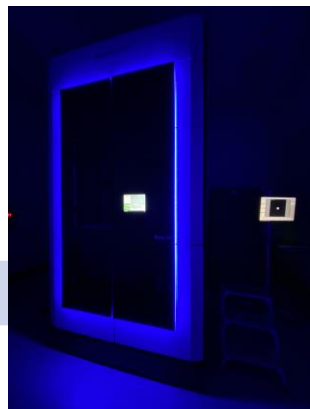


My Timeline at Purdue

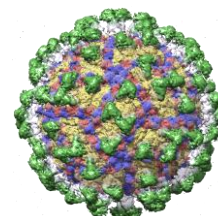
PI4L Titan G4
Krios -2021



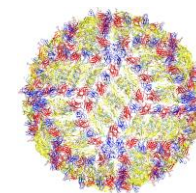
Zika virus bound to
IgM antibody - 2022



EV-69 virus
antibodies - 2019

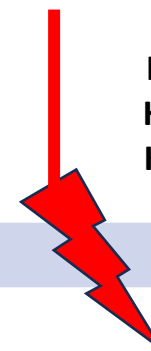


Potent antibodies
against Zika - 2017



Zika virus -
2016

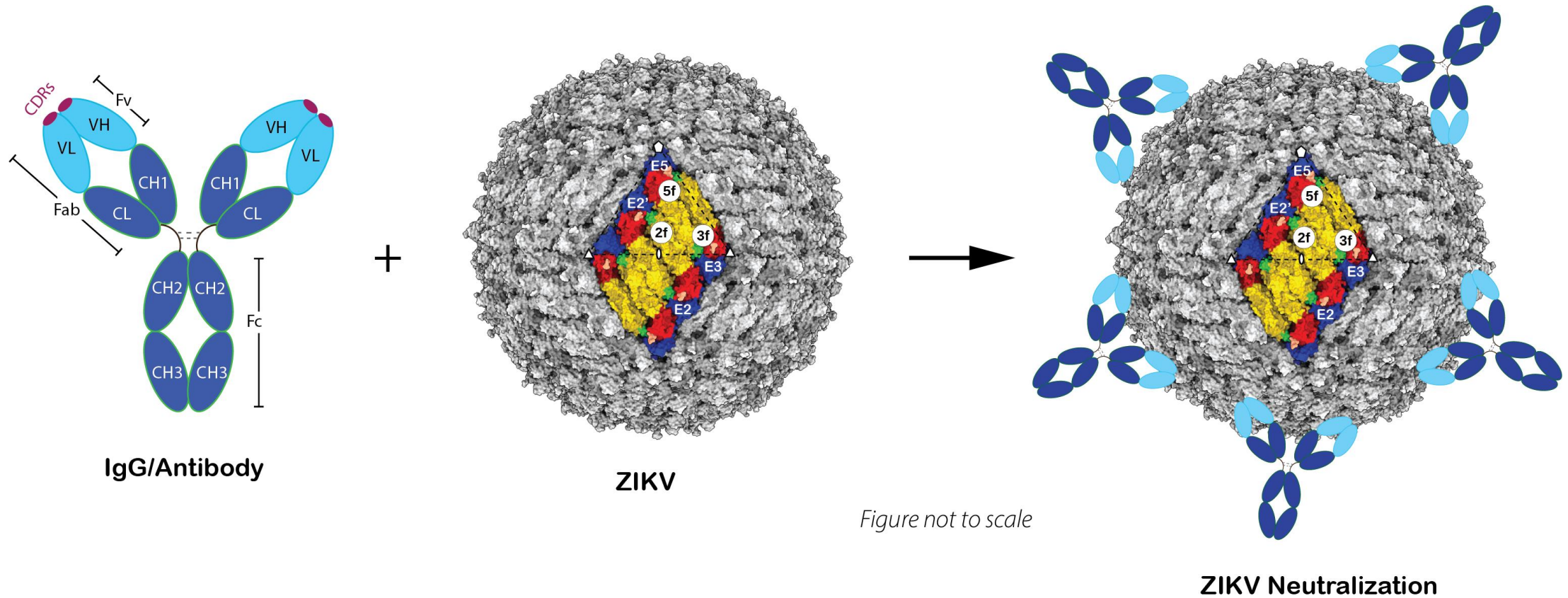
Resolution – Revolution ~ 2015



Hockmeyer
Hall & Titan
Krios - 2009



Structural immunology and development of biologics against viruses

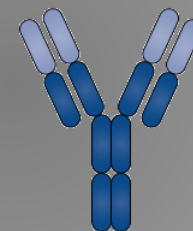


Epitope data → Efficacious immunogen / vaccine design

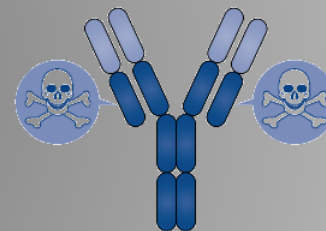
Paratope data → Development of therapeutic antibodies

2021, Nature reviews Drug Discovery

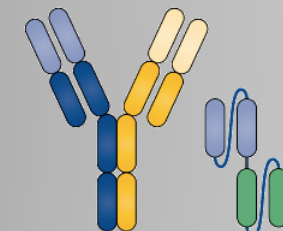
a Canonical antibodies



b Antibody-drug conjugates



c Bispecifics



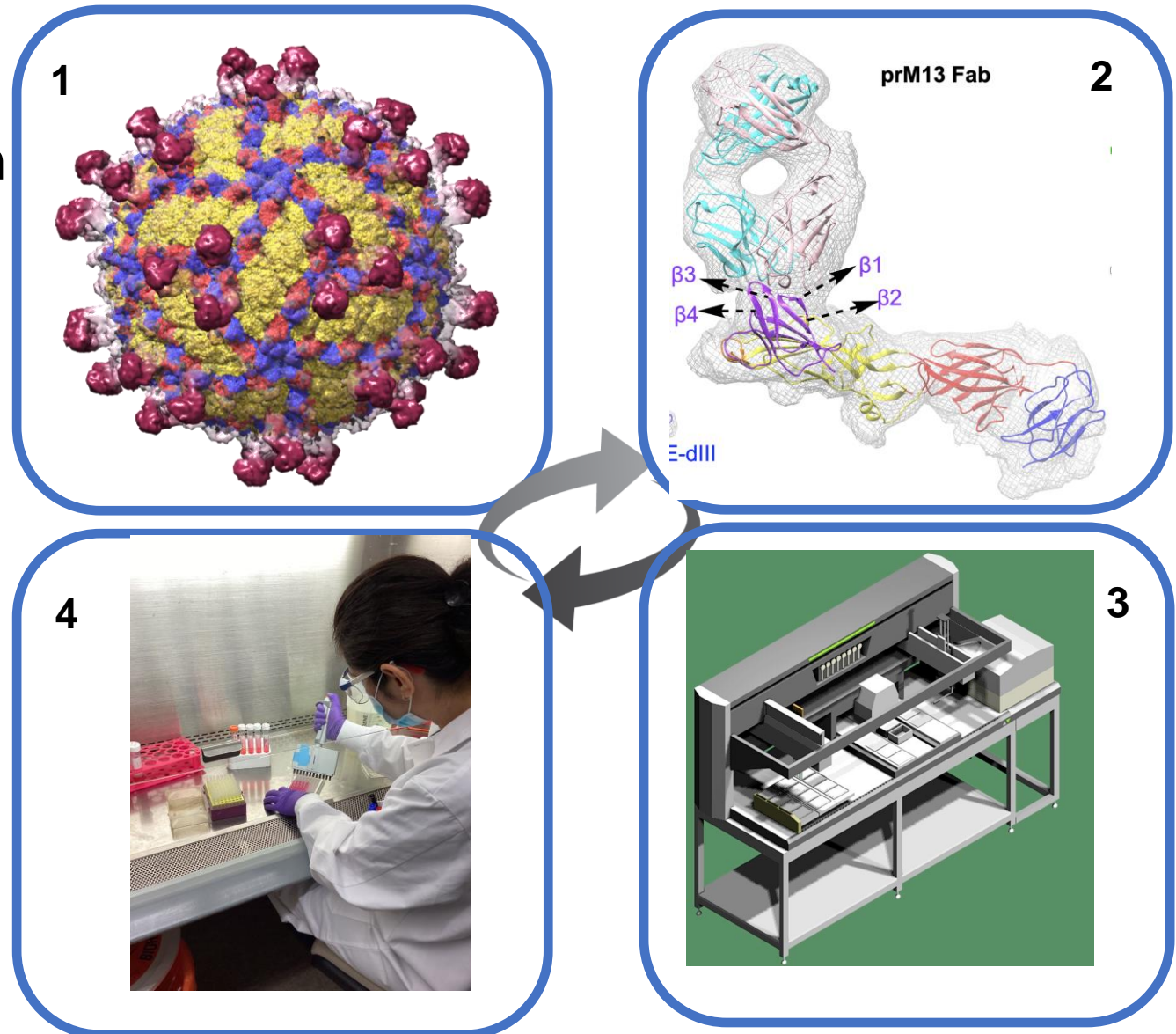
d Fragments



BIOMOLECULAR DESIGN

A strategy that integrates across Purdue strengths into a cohesive and state-of-the-art approach to the design of molecules impacting all aspects of life sciences from agriculture, through medicine and nanomolecule design:

1. Structural Biology (informs->)
2. Computational Design (informs ->)
3. Protein Engineering (provides new molecules ->)
4. Biological Evaluation - - - commercialization



Thank you!