

# Stanford

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## Peter S. Kim

Virginia and D. K. Ludwig Professor of Biochemistry

### CONTACT INFORMATION

- **Administrative Contact**

Vi Dang

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### Bio

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### ACADEMIC APPOINTMENTS

- Professor, Biochemistry
- Member, Bio-X
- Member, Wu Tsai Human Performance Alliance
- Member, Maternal & Child Health Research Institute (MCHRI)
- Institute Scholar, Sarafan ChEM-H
- Member, Wu Tsai Neurosciences Institute

### ADMINISTRATIVE APPOINTMENTS

- Lead Investigator, Infectious Disease Initiative, Chan Zuckerberg Biohub, (2017- present)
- Institute Scholar, Stanford ChEM-H, (2014- present)
- Virginia & D.K. Ludwig Professor of Biochemistry, Stanford University School of Medicine, (2014- present)
- President, Merck Research Laboratories, Merck & Co., Inc., (2003-2013)
- Executive Vice President, Merck Research Laboratories, Merck & Co., Inc., (2001-2002)
- Associate Head, Department of Biology, MIT, (1999-2001)
- Investigator, Howard Hughes Medical Institute, (1997-2001)
- Professor of Biology, MIT, (1995-2001)
- Associate Investigator, Howard Hughes Medical Institute, (1993-1997)
- Member, Whitehead Institute for Biomedical Research, (1992-2001)
- Associate Professor of Biology, MIT, (1992-1995)
- Assistant Investigator, Howard Hughes Medical Institute, (1990-1993)
- Assistant Professor of Biology, MIT, (1988-1992)
- Associate Member, Whitehead Institute for Biomedical Research, (1988-1992)
- Whitehead Fellow, Whitehead Institute for Biomedical Research, (1985-1988)

## HONORS AND AWARDS

- Arthur Kornberg and Paul Berg Lifetime Achievement Award in Biomedical Sciences, Stanford University (2018)
- Member, National Academy of Sciences (1997)
- Member, National Academy of Medicine (formerly, Institute of Medicine) (2000)
- Member, National Academy of Engineering (2016)
- Fellow, American Academy of Arts and Sciences (2008)
- Doctor of Science, Honoris Causa, Pohang University of Science and Technology (2011)
- Presidents' Circle, The National Academies (2006)
- Harvey Lecture, The Harvey Society (2002)
- Fellow, Biophysical Society (1999)
- Fellow, American Association for the Advancement of Science (1999)
- Hans Neurath Award, The Protein Society (1999)
- Ho-Am Prize for Basic Science, The Samsung Foundation (1998)
- Fellow, American Academy of Microbiology (1997)
- DuPont Merck Young Investigator Award, The Protein Society (1994)
- Eli Lilly Award in Biological Chemistry, American Chemical Society (1994)
- NAS Award in Molecular Biology, National Academy of Sciences (1993)

## BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Medical Advisory Board, Howard Hughes Medical Institute (2016 - present)
- Scientific Advisory Board, Vaccine Research Center, NIAID, NIH (2014 - present)
- MIT Corporation Visiting Committee, Department of Biology, MIT (2004 - present)
- Council, National Academy of Sciences (2015 - 2018)
- Board of Scientific Advisors, Jane Coffin Childs Memorial Fund (2015 - 2018)
- Advisory Council, Department of Molecular Biology, Princeton University (2015 - 2021)
- External Scientific Advisory Board, Harvard Program in Therapeutic Science, HMS (2014 - 2021)

## PROFESSIONAL EDUCATION

- A.B., Cornell University , Chemistry (1979)
- Ph.D., Stanford University School of Medicine , Biochemistry (1985)

## LINKS

- the Peter Kim Lab: <http://www.peterkimlab.stanford.edu>

## Research & Scholarship

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### CURRENT RESEARCH AND SCHOLARLY INTERESTS

We are studying the mechanism of viral membrane fusion and its inhibition by drugs and antibodies. We use the HIV envelope protein (gp120/gp41) as a model system. Some of our studies are aimed at creating an HIV vaccine that elicits antibodies against a transient, but vulnerable, intermediate in the membrane-fusion process, called the pre-hairpin intermediate.

We are also interested in protein surfaces that are referred to as "non-druggable". These surfaces are defined empirically based on failure to identify small, drug-like molecules that bind to them with high affinity and specificity. Some of our efforts are aimed at characterizing select non-druggable targets. We are also developing methods to identify ligands for non-druggable protein surfaces.

## Teaching

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### STANFORD ADVISEES

#### Med Scholar Project Advisor

Theodora Bruun

#### Doctoral Dissertation Reader (AC)

Angel Kuo, Brianna McIntosh, Anahita Nejatfard, Ben Ou, Delaney Smith, Valentino Sudaryo, Aaron Wilk, Izumi de los Rios Kobara

#### Orals Chair

Gita Abhiraman

#### Postdoctoral Faculty Sponsor

Brian Hie, Soohyun Kim, Hyeonseob Lim, Thi Thuy Tien Nguyen, Shaogeng Tang, Duo Xu, Chu Zheng

#### Doctoral Dissertation Advisor (AC)

Theodora Bruun, Rebekah Costello, Maria Filsinger Interrante, Gokul Kannan, Ashley Utz

### GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biochemistry (Phd Program)
- Biophysics (Phd Program)
- Cancer Biology (Phd Program)
- Chemical and Systems Biology (Phd Program)
- Immunology (Phd Program)
- Microbiology and Immunology (Phd Program)
- Molecular and Cellular Physiology (Phd Program)

## Publications

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### PUBLICATIONS

- **Protect, modify, deprotect (PMD): A strategy for creating vaccines to elicit antibodies targeting a specific epitope** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Weidenbacher, P. A., Kim, P. S.  
2019; 116 (20): 9947–52
- **Vaccination with peptide mimetics of the gp41 prehairpin fusion intermediate yields neutralizing antisera against HIV-1 isolates** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Bianchi, E., Joyce, J. G., Miller, M. D., Finnefrock, A. C., Liang, X., Finotto, M., Ingallinella, P., McKenna, P., Citron, M., Ottinger, E., Hepler, R. W., Hrin, R., Nahas, et al  
2010; 107 (23): 10655-10660
- **A human monoclonal antibody neutralizes diverse HIV-1 isolates by binding a critical gp41 epitope** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Miller, M. D., Gelezianas, R., Bianchi, E., Lennard, S., Hrin, R., Zhang, H. C., Lu, M. Q., An, Z. Q., Ingallinella, P., Finotto, M., Mattu, M., FINNEFROCK, A. C., Bramhill, et al  
2005; 102 (41): 14759-14764

- **Protein design of an HIV-1 entry inhibitor** *SCIENCE*  
Root, M. J., Kay, M. S., Kim, P. S.  
2001; 291 (5505): 884-888
- **Mechanisms of viral membrane fusion and its inhibition** *ANNUAL REVIEW OF BIOCHEMISTRY*  
Eckert, D. M., Kim, P. S.  
2001; 70: 777-810
- **Inhibiting HIV-1 entry: Discovery of D-peptide inhibitors that target the gp41 coiled-coil pocket** *CELL*  
Eckert, D. M., Malashkevich, V. N., Hong, L. H., Carr, P. A., Kim, P. S.  
1999; 99 (1): 103-115
- **HIV entry and its inhibition** *CELL*  
Chan, D. C., Kim, P. S.  
1998; 93 (5): 681-684
- **Influenza hemagglutinin is spring-loaded by a metastable native conformation** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Carr, C. M., Chaudhry, C., Kim, P. S.  
1997; 94 (26): 14306-14313
- **Core structure of gp41 from the HIV envelope glycoprotein** *CELL*  
Chan, D. C., Fass, D., Berger, J. M., Kim, P. S.  
1997; 89 (2): 263-273
- **A SPRING-LOADED MECHANISM FOR THE CONFORMATIONAL CHANGE OF INFLUENZA HEMAGGLUTININ** *CELL*  
Carr, C. M., Kim, P. S.  
1993; 73 (4): 823-832