BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Min Li

eRA COMMONS USER NAME (credential, e.g., agency login): N/A

POSITION TITLE: Staff Scientist

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Shandong University, Shandong, China	B.S.	09/1994	Microbiology
Shanghai Institute of Biochemistry, Chinese Academy of Sciences, Shanghai, China	Ph.D.	07/1999	Biochemistry and Molecular Biology

A. Personal Statement

In order to replicate, HIV-1 must insert its own viral DNA into the genome of the host cell, which is an essential step in the virus life cycle. Integrase (IN), a virally coded protein, is the key enzyme that catalyzes this DNA cutting and joining process (DNA integration). Inhibitors that target IN are now frontline drugs in the treatment of HIV. These drugs target HIV IN/DNA nucleoprotein complexes (intasomes). High-resolution structures of intasomes are therefore required to understand the detailed mechanism of integration, how integrase inhibitors work, and mutations that confer drug resistance.

Our lab is one of the pioneer groups in the study of molecular biology of HIV DNA integration. My previous work have been essential for our recent success in obtaining high-resolution structures of HIV intasomes. I have contributed to key steps, from the development of a high-fidelity in vitro integration assay system, to the discovery of the critical nucleoprotein complexes (intasomes) on the integration pathway, and have developed the hyperactive IN mutant that made high-resolution structural studies of intasomes possible.

In 2020, built upon our breakthrough of structural studies of HIV intasomes, in collaboration with Dmitry Lyumkis's group at Salk, we have solved structures of HIV intasomes bound to the latest generation of IN inhibitors at ~2.8 Å by cryo-electron microscopy (Cryo-EM). I plan to build on these accomplishments and continue to expand our mechanistic and structural studies of HIV DNA integration.

B. Positions, Scientific Appointments, and Honors

03/07-present **Staff Scientist**
Molecular Virology Section, Laboratory of Molecular Biology
NIDDK, National Institutes of Health, Bethesda, MD

10/04-03/07 **Research Fellow**
Molecular Virology Section, Laboratory of Molecular Biology,
NIDDK, National Institutes of Health, Bethesda, MD

07/02-10/04 **Research Associate**

Molecular Pathology Division and Core Laboratories, Department of Pathology,
Loyola University Medical Center, Chicago, IL

01/00-07/02 **Visiting Fellow**
Molecular Virology Section, Laboratory of Molecular of Biology
NIDDK, National Institutes of Health; Bethesda, MD

08/99-01/00 **Research Associate**
Shanghai Research Center of Biotechnology
Chinese Academy of Sciences; Shanghai, China

1999 "MEIJI NYU-GYO" International Life-science Award, Shanghai
1999 "GUANGHUA" National Science and Technology Award, Shanghai

C. Contributions to Science

1, Development of an *in vitro* reaction system for full-fidelity HIV DNA integration and discovery of the critical intermediates on the integration pathway

Li M. and Craigie R. Processing of the viral DNA ends channels the HIV-1 integration reaction to concerted integration. *J. Biol. Chem*. 2005 280(32):29334-29339.

Li M., Mizuuchi M., Burke T. and Craigie R. Retroviral DNA integration: reaction pathway and critical intermediates. *The EMBO Journal* 2006 25, 1295-1304

Li M. and Craigie R. Nucleoprotein complex intermediates in HIV-1 integration. *Methods*. 2009 47(4):237-42.

2, Development of methodologies to trap and study HIV intasomes *in vitro*

Kotova S.*, **Li M.***, Dimitriadis E. and Craigie R. Nucleoprotein intermediates in HIV-1 DNA integration visualized by atomic force microscopy. *J Mol Biol*. 2010 399(3):491-500.

Min Li, Vassili Ivanov, Michiyo Mizuuchi, Kiyoshi Mizuuchi, Robert Craigie. DNA requirements for assembly and stability of HIV-1 intasomes. *Protein Sci.* 2012 21(2):249-57

Min Li and Robert Craigie. Retroviral intasomes: progress and questions. *Structure*. 2012 20(11): 1804-5

3, Development of a hyperactive mutant of HIV integrase overcomes the obstacles for structure studies of HIV-1 intasomes

Li M., Jurado KA., Lin S., Engelman A., Craigie R. Engineered Hyperactive Integrase for Concerted HIV-1 DNA Integration. *PloS One.* 2014 9(8):e105078

Li M.*, Chem X., Wang H., Jurado K., Engelman A. and Craigie R. A Peptide Derived from Lens Epithelium-Derived Growth Factor Stimulates HIV-1 DNA Integration and Facilitates Intasome Structural Studies. *J Mol. Biol.* 2020 432(7):2055-66

4, In collaboration with Dmitry Lyumkis, determine a serial of HIV-1 intasomes alone the integration pathway

Passos D.*, **Li M.***, Yang R., Rebensburg S., Ghirlando R., Jeon Y., Shkriabai N., Kvaratskhelia M., Craigie R. and Lyumkis D. Cryo-EM Structures and Atomic Model of the HIV-1 Strand Transfer Complex Intasome. *Science*. 2017 355(6320):89-92

Passos D.***, Li M.*,** Jóźwik IK., Zhao XZ., Santos-Martins D., Yang R., Smith SJ., Jeon Y., Forli S., Hughes SH., Burke T., Craigie R., Lyumkis D. Structural basis for strand-transfer inhibitor binding to HIV intasomes. *Science*. 2020 367(6479):810-814