OMB No. 0925-0001 and 0925-0002 (Rev. 09/17 Approved Through 03/31/2020)

BIOGRAPHICAL SKETCH

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NAME: Robert M. Glaeser

eRA COMMONS USER NAME (credential, e.g., agency login): rmglaeser

POSITION TITLE: Biophysicist 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 DateMM/YYYY | FIELD OF STUDY |
| --- | --- | --- | --- |
| University of Wisconsin, Madison | B.S. | 1959 | Physics & Mathematics |
| University of California, Berkeley | Ph.D. | 1964 | Biophysics |
| Oxford University | Postdoc | 1963-64 | Quantum Chemistry |
| University of Chicago | Postdoc | 1964-65 | Quantum Chemistry |
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**A. Personal Statement**My research career has involved a mixture of development of methodology for structural biology, with a major emphasis on electron microscopy, and applications of this methodology to specific, biological projects. My current research activity focuses on two topics: (1) why specimen preparation is currently so unreliable, and what might be a better way to prepare specimens; and (2) ways to achieve the full amount of phase contrast with cryo-EM specimens. The first of these two areas is directly relevant to the current proposal. My interest in specimen preparation was renewed when Taylor and I were invited to write a retrospective on preparing grids for cryo-EM. We drew attention to the fact that the standard picture of what such specimens looked like did not include the potentially harmful consequences of interacting with the air-water interface. Although a concern in the earliest days, it had been forgotten for 20 years, until we again brought it up. My own response was to develop affinity grids, the idea being to immobilize particles and thus prevent interaction with the air-water interface. In addition, I have published more recent reviews of the how wide-spread the literature is on this topic, outside of the field of cryo-EM.

1. Taylor, K.A., R.M. Glaeser, 2008. Retrospective on the early development of cryoelectron microscopy of macromolecules and a prospective on opportunities for the future. Journal of Structural Biology 163, 214-223
2. Han, B.-G., Z. Watson, H. Kang, A. Pulk, K.H. Downing, J. Cate, R.M. Glaeser, 2016. Long shelf-life streptavidin support-films suitable for electron microscopy of biological macromolecules. Journal of Structural Biology 195, 238-244
3. Han, B.-G., Z. Watson, J.H.D. Cate, R.M. Glaeser, 2017. Monolayer-crystal streptavidin support films provide an internal standard of cryo-EM image quality. Journal of Structural Biology 200, 307-313
4. Glaeser, R.M., 2018. Proteins, interfaces, and cryo-EM Grids. Current Opinion in Colloid & Interface Science 34, 1-11

**B. Positions and Honors
Positions and Employment**

1965-1966 Lecturer, Division of Medical Physics, University of California, Berkeley

1965-2006 Faculty Scientist, Life Sciences Division, Lawrence Berkeley National Laboratory

1966-1971 Assistant Professor, Biophysics, University of California, Berkeley

1971-1976 Associate Professor, Biophysics, University of California, Berkeley

1976-2006 Professor, University of California, Berkeley

2006-present Emeritus Professor, University of California, Berkeley

2006-present Biophysicist Staff Scientist, Lawrence Berkeley National Laboratory

**Awards and Major Professional Activities**

1978-1983 Divisional Dean, Biological Sciences, University of California, Berkeley

1983-1984 Guggenheim Foundation Fellow (at MRC Lab Molec. Biol., Cambridge)

1983-1986 Member, National Advisory Committee on Electron Microscopy, NIH Division of Research Resources

01/86-12/86 President, Electron Microscopy Society of America

1988-1989 Alexander von Humboldt Award (at Max-Planck-Institute for Biochemistry, Martinsried)

1992 Elizabeth R. Cole Award, Biophysical Society

1994-1997 Council Member, Biophysical Society

1998-2003 US National Committee, International Union Pure and Applied Biophysics

1999-2001 US National Committee, International Union Crystallography

2001 Chair, Gordon Conference on 3-D Electron Microscopy

2004 Distinguished Scientist Award for the Biological Sciences, Microscopy Society of America

2016 Member, National Academy of Sciences

2016 Member, American Academy of Arts and Sciences

2016-2018 Member, International Academic Advisory Board, Beijing Advanced Innovation Center for Structural Biology

2018 Glenn T. Seaborg Award and Metal, UCLA Department of Chemistry & Biochemistry

**C. Contributions to Science**Areas of previous work, for which my lab is internationally well recognized, include:

1. establishing the extent to which radiation damage limits imaging at high resolution, and the need to use averaging of noisy images to overcome those limitations
	1. Glaeser, R.M., 1971. Limitations to Significant Information in Biological Electron Microscopy as a Result of Radiation Damage. Journal of Ultrastructure Research 36, 466-482
2. the use of frozen-hydrated specimens to preserve native, hydrated structure and, to a small extent, to improve the degree to which biological macromolecules can tolerate radiation damage
	1. Glaeser, R.M., K.A. Taylor, 1978. Radiation-Damage Relative to Transmission Electron-Microscopy of Biological Specimens at Low-Temperature - Review. Journal of Microscopy-Oxford 112, 127-138.
3. characterization of the resolution-limiting phenomenon of beam-induced movement
	1. Henderson, R., R.M. Glaeser, 1985. Quantitative analysis of image contrast in electron micrographs of beam-sensitive crystals. Ultramicroscopy 16, 139-150
4. development of devices for in-focus phase contrast in transmission electron microscopy
	1. Glaeser, R.M., 2013. Invited Review Article: Methods for imaging weak-phase objects in electron microscopy. Review of Scientific Instruments 84, 111101