### CHEMICAL HERITAGE FOUNDATION

## **CAROLINE KISKER**

The Pew Scholars Program in the Biomedical Sciences

Transcript of Interviews Conducted by

Nicole Nelson

at

The Rudolf Virchow Center Würzburg, Germany

on

18 and 19 June 2008

(With Subsequent Corrections and Additions)



Caroline Kisker

### ACKNOWLEDGEMENT

This oral history is part of a series supported by a grant from the Pew Charitable Trusts based on the Pew Scholars Program in the Biomedical Sciences. This collection is an important resource for the history of biomedicine, recording the life and careers of young, distinguished biomedical scientists and of Pew Scholars Program in the Biomedical Sciences Advisory Committee members.

This oral history is made possible through the generosity of



#### CHEMICAL HERITAGE FOUNDATION Oral History Program FINAL RELEASE FORM

This document contains my understanding and agreement with the Chemical Heritage Foundation with respect to my participation in the audio-recorded interview conducted by <u>Nicole Nelson</u> on <u>18 and 19 June 2008</u>. I have read the transcript supplied by Chemical Heritage Foundation.

- 1. The audio recording, corrected transcript, photographs, and memorabilia (collectively called the "Work") will be maintained by the Chemical Heritage Foundation and made available in accordance with general policies for research and other scholarly purposes.
- 2. I hereby grant, assign, and transfer to the Chemical Heritage Foundation all right, title, and interest in the Work, including the literary rights and the copyright, except that I shall retain the right to copy, use, and publish the Work in part or in full until my death.
- 3. The manuscript may be read and the audio recording(s) heard by scholars approved by the Chemical Heritage Foundation subject to the restrictions listed below. The scholar pledges not to quote from, cite, or reproduce by any means this material except with the written permission of the Chemical Heritage Foundation.
- 4. I wish to place the conditions that I have checked below upon the use of this interview. I understand that the Chemical Heritage Foundation will enforce my wishes until the time of my death, when any restrictions will be removed.

Please check one:

a.

#### No restrictions for access.

**NOTE:** Users citing this interview for purposes of publication are obliged under the terms of the Chemical Heritage Foundation Oral History Program to obtain permission from Chemical Heritage Foundation, Philadelphia, Pennsylvania.

b.

**Semi-restricted access.** (May view the Work. My permission required to quote, cite, or reproduce.)

c.\_\_\_\_

**Restricted access.** (My permission required to view the Work, quote, cite, or reproduce.)

This constitutes my entire and complete understanding.

(Signature) Caroline F. Kisker Date) Thomas (Date) 200

This interview has been designated as Semi Restricted Access.

One may view the oral history with the permission of CHF. However, the permission of the interviewee is required to quote from, cite, or reproduce the oral history.

Please contact CHF to request permission.



Chemical Heritage Foundation Oral History Program 315 Chestnut Street Philadelphia, Pennsylvania 19106



The Chemical Heritage Foundation (CHF) serves the community of the chemical and molecular sciences, and the wider public, by treasuring the past, educating the present, and inspiring the future. CHF maintains a world-class collection of materials that document the history and heritage of the chemical and molecular sciences, technologies, and industries; encourages research in CHF collections; and carries out a program of outreach and interpretation in order to advance an understanding of the role of the chemical and molecular sciences, technologies, and industries in shaping society.

## **CAROLINE F. KISKER**

1964	Born in Berlin, Germany on 1 May
	Education
1991 1994	<i>Diplom</i> , Freie Universität, Berlin, Germany Ph.D., Freie Universität, Berlin, Germany
	Professional Experience
1994-1997	California Institute of Technology, Pasadena, California Postdoctorate, Biochemistry
1998-2001 2001-2006 2006-present	State University of New York, Stony Brook Assistant Professor, Department of Pharmacological Sciences Associate Professor, Department of Pharmacological Sciences Adjunct Professor, Department of Pharmacological Sciences
2006-present	Rudolf Virchow Center for Experimental Biology, University of Würzburg, Germany Professor

## Honors

1995	Karl Ramsauer Award for Ph.D. Thesis
1995-1997	Postdoctoral Fellowship Deutsche Forschungsgemeinschaft
1998-1999	Targeted Research Opportunity Award SUNY Stony Brook
2000-2004	Pew Scholar in the Biomedical Sciences

#### ABSTRACT

Caroline F. Kisker grew up in West Berlin, West Germany, where she attended the John F. Kennedy German-American grammar school. After completing her Abitur, Kisker planned to study medicine, but due to the complicated university placement lottery system Kisker was not able to matriculate at a university. In the interim, while working as a medical apprentice, she decided to pursue biochemistry at the Freie Universität in Berlin. With the fall of the Berlin Wall in 1989, Kisker witnessed an influx of East German students to West Berlin and the universities there. She joined the large laboratory of Wolfram Saenger and throughout the course of her *Diplom* and Ph.D., Kisker had the opportunity to conduct laboratory work in Zurich, Switzerland and Frankfurt, Germany with Nobel Laureate Hartmut Michel. Her doctoral thesis centered on the determination of medically relevant tetracycline repressor protein, the results of which she published in Science. While working in the Saenger laboratory, Kisker met her husband Hermann Schindelin. After completing their doctorates, they both pursued postdoctoral research in Douglas C. Rees's laboratory at the California Institute of Technology (Caltech). At Caltech, Kisker solved the sulfite oxidase structure and published it in Cell. At the end of her time as a postdoctoral fellow, Kisker accepted a position as a faculty member at State University of New York, Stony Brook. In 2000 Kisker received the Pew Scholars Program in the Biomedical Sciences award and in 2006 she moved to the Rudolf Virchow Center at the University of Würzburg in Germany. She continues her research on structurebased drug design and DNA repair through the tools of structural biology. Throughout her oral history Kisker discusses the differences between the German and American educational and scientific systems and many of the challenges associated with being a woman in science, especially having to balance work with family life during the transition from Stony Brook back to Germany. Kisker also talks about the ways in which structural biology has changed throughout her career in response to new technologies and the ways in which funding affects her research and research choices.

#### **INTERVIEWER**

**Nicole Nelson** graduated with a B.Sc. in Genetics and Social and Political Thought from the University of Western Ontario in 2004. She is currently a Ph.D. candidate in the Science and Technology studies program at Cornell University. Nicole is interested in the sociology of contemporary biomedicine, especially genetics and model organisms. Her dissertation project is an ethnographic study of the social processes involved in developing animal models (especially mouse models) for studying the genetics of complex human behaviors. In addition to her dissertation research, Nicole works as a research assistant conducting interviews for several projects, including the CHF's oral history project for Pew Scholars in the Biomedical Sciences.

## TABLE OF CONTENTS

Early Education Growing up in the enclosed city of West Berlin, West Germany.	1
Grammar school at the John F. Kennedy German-American school in both German and English. Interest in medicine and decision to study biochemistry. <i>Abitur</i> and University lottery. Biochemistry at the Freie Universität. Differences between the American and German education systems. Interest in gymnastics. Trends regarding women in science.	
Scholastics, Biochemistry, and Scientific Interests Biochemistry studies at the Freie Universität with Wolfram Saenger. Interest in macromolecular crystallography. Meeting husband Hermann Schindelin. Working in laboratories in Zurich, Switzerland and Frankfurt, Germany.	19
Practicing Science in the United States and Abroad Postdoctoral positions in the United States. Two-body problem. Path to professorship in Germany and <i>Habilitation</i> . Max Planck Institutes. Funding. University system in Germany.	24
Berlin, Germany Fall of the Berlin Wall. Influx of East German students. Resources available to West and East German scientists. Travel to East Berlin.	30
Undergraduate Thesis and Graduate Research and Technologies Structure of Tetracycline Repressor Complex. Publication in <i>Science</i> . Crystallization and structure determination. Synchrotron in Hamburg, Germany. Synchrotron technology. Laboratory management.	35
Postdoctoral Research California Institute of Technology. Douglas C. Rees. Collaboration with Amgen. Gamma carbonic anyhydrase from an <i>archaeon</i> . Sulfite oxidase structure published in <i>Cell</i> . Rees's management style. Advances in computing and crystallography.	66
<ul> <li>State University of New York, Stony Brook</li> <li>Looking for faculty positions. Decision to stay in the United States.</li> <li>Difficulty of finding students. Management style. Interest in protein- DNA interactions.</li> </ul>	79

Pew Scholar in Biomedical Sciences Research on DNA repair. Familiarity with Pew. Annual Meetings. Costa		
Rica. Visa problems. Importance of bringing along the family. Interacting with people outside of structural biology. Publishing with Sylvie Doublié.		
Sylvie Doublie.		
Funding Science Applying for National Institutes of Health grants. Department of Energy funds. Problems associated with needing preliminary data in crystallography. Reviewing grants with Hermann.	102	
Rudolf Virchow Center, University of Würzburg Decision to move back to Germany. Martin Lohse. Transitioning graduate students between Stony Brook and Würzburg. Difficulty of moving with school-age children.	107	
Structural Biology and Biomedical Science Moving beyond structure determination. Biochemistry. Structure based drug design. Sharing data and material. Competition.	112	
Career and Family Balancing life and work. Sharing responsibilities. Research collaborations with Hermann. Science education. <i>Rudi's Forschercamp</i> . Undergraduate education. Problem solving.	124	

Index

133

#### A

Abitur, 2, 7, 8, 12, 18, 21 Albert Einstein College of Medicine, 69 Amgen, 68, 127 Antibiotics, 38, 66, 96 Archae, 69

#### B

Bacteria, 38, 42, 113, 119, 127 Baden-Württemburg, Germany, 9, 32 Bavaria, Germany, 7, 9 Berlin, Germany, 1, 2, 3, 7, 9, 15, 21, 28, 30, 32, 34, 36, 56, 61, 66, 73, 84, 107, 122 John F. Kennedy School, 2 Biochemistry, 2, 3, 7, 12, 15, 16, 19, 21, 22, 23, 28, 36, 56, 96, 130 Biology, 2, 10, 16, 17, 18, 19, 21, 38, 87, 129 structural biology, 22, 23, 31, 42, 53, 63, 77, 79, 96, 98, 103, 104, 108, 113, 114, 116, 119, 120, 121, 123, 124, 126, 127 Biosynthesis, 119 Bjorkman, Pamela J., 91 Boston, Massachusetts, 1, 6

## С

California Institute of Technology, 62, 67, 68, 73, 91 *Cell*, 70, 88 Chemistry, 1, 2, 7, 10, 12, 16, 18, 19, 21, 57, 89, 129 inorganic chemistry, 20, 21 physical chemistry, 19 Chen, Paul J., 66, 84, 86 Chicago, Illinois, 79, 80, 106 Children, 1, 2, 4, 5, 6, 9, 11, 15, 16, 63, 82, 101, 107, 110, 111, 112, 124, 125, 128, 129 cis-Platin, 101
Collaborations, 68, 69, 76, 77, 97, 124
Costa Rica, 91, 92, 93, 94, 106
Crystallography, 22, 23, 42, 43, 44, 66, 79, 117
crystallization, 41, 43, 104, 106, 121, 122
diffraction, 43, 45, 50, 73, 116
electron density maps, 44, 45, 46, 51, 52
selenomethionine substitution, 44, 116

## D

Deisenhofer, Johann, 42, 122
DFG [*Deutsche Forschungsgemeinschaft*], 108 *Diplom*, 36, 130
DNA, 32, 38, 39, 40, 86, 88, 90, 91, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 113, 114, 122, 123, 124, 126, 129
DNA repair, 21, 86, 88, 89, 90, 91, 94, 95, 96, 98, 100, 101, 102, 103, 104, 105, 113, 114, 122, 123, 124
DOE [Department of Energy], 90, 103
Doublié, Sylvie, 97

## E

E. coli, 42
EMBO [The European Molecular Biology Organization], 69, 86, 97, 122
Enemark, John, 70, 77
Enzymes, 27, 70, 84, 88, 89, 91, 99, 119
DNA polymerase, 89, 98
nuclease, 101
RB69, 98
UvrA, 99, 100, 101, 102
UvrB, 86, 99, 100, 102, 122
UvrC, 99, 100, 101, 102
Ernst Moritz Arndt University of Greifswald, 41
Ethics, 126

### F

FASEB [Federation of American Societies Experimental Biology], 27, 123
Ferry, James G., 69
Frankfurt, Germany, 3, 23, 41
Freie Universität Berlin, 3, 36
Funding, 26, 27, 28, 78, 82, 85, 86, 88, 89, 90, 99, 102, 103, 104, 105, 112, 131

#### G

Genes, 89, 101, 120 Germany, 1, 2, 3, 4, 5, 6, 7, 8, 12, 15, 17, 24, 25, 26, 28, 30, 31, 45, 49, 57, 62, 63, 66, 67, 72, 73, 74, 75, 76, 77, 82, 83, 91, 107, 108, 109, 110, 111, 122, 126, 127, 129 Berlin Wall, 30, 32, 34 East Berlin, 32, 33 East Germany, 31, 32, 33, 34 West Berlin, 30, 32, 34 West Germany, 30, 33 Göttingen, Germany, 82 Grants. *See* Funding *Gymnasium*, 7, 9, 16

#### Η

Habilitation, 25, 76 Hamburg, Germany, 45, 46 Harrison, Stephen C., 66, 67 Harvard University, 1, 67, 102 *Hauptschule*, 8 Hinrichs, Winfried, 41 Howard Hughes Medical Institute, 26, 77 Huber, Robert, 42

### J

Journal of Molecular Biology, 60

## L

Lederle Pharmaceuticals, 66, 119 Lohse, Martin, 107, 108

#### Μ

MacKinnon, Roderick, 112 Matthews, Brian W., 80 Max-Planck Institute, 24, 26, 82 Michel, Hartmut, 3, 23, 42 *Molecular Cell*, 97 Moscow, Russia, 32 Mycobacterium tuberculosis, 89, 119

#### Ν

NIH [National Institutes of Health], 26, 27, 102, 105, 108, 112
R01 grants, 27, 88, 89, 90, 99, 102, 103, 104, 109, 112
study sections, 103
Nobel Prize, 3, 23, 42
NSF [National Science Foundation], 105

### 0

Oregon State Health & Science University, 80 Oregon State University, 80

## P

Pasadena, California, 68 Pew Charitable Trusts annual meetings, 91, 93, 95 Pew Scholars, 90, 91, 93, 97, 105, 106, 112 Scholars in the Biomedical Sciences Award, 90, 91, 92, 93, 97, 98, 99, 102, 103, 105, 106 Pharmacology, 23 Physics, 7, 10, 17, 19, 35, 129 Plasmids, 89, 120, 121, 126 PLoS Biology, 21 Post-Doctorate, 3, 4, 17, 24, 25, 26, 27, 37, 41, 43, 44, 49, 50, 53, 55, 56, 57, 58, 60, 66, 67, 68, 70, 71, 72, 74, 75, 77, 78, 79, 80, 83, 84, 85, 106, 108, 122, 123, 126 Proteins, 23, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 54, 60, 62, 68, 69, 70, 73, 87, 88, 96, 100, 101, 104, 113, 114, 115, 116, 117, 118, 119, 120, 121, 123, 127

gamma carbonic anhydrase, 69 membrane protein, 23, 112 protein membrane, 23, 38, 112, 113 sulfite oxidase, 70, 77, 88, 89, 102 tetracycline repressor, 36, 38, 39, 41, 46, 48, 54, 60, 63, 66, 88, 89, 116 XPD, 21, 101, 123 Publishing, 36, 60, 71, 97, 98, 102, 114, 120, 121, 122, 123, 125, 131

#### R

Realschule, 8 Rees, Douglas C., 66, 67, 68, 69, 70, 71, 72, 77, 88, 89, 95, 102, 104 Roderick, Steven L., 69 Rudolf Virchow Center, 23, 26, 76, 107, 108, 115, 128 Forscherreporter, 129 Rudi's Forschercamp, 128 Rudi's Forschercamp, 129

### S

Saenger, Wolfram, 3, 36, 39, 40, 60, 66 San Francisco, California, 95 SAT [scholastic aptitude test], 14 Schindelin, Hermann, 22, 23, 51, 53, 62, 63, 66, 67, 70, 71, 72, 74, 75, 77, 80, 82, 84, 86, 87, 88, 93, 97, 104, 105, 107, 108, 109, 110, 114, 127, 130 Science, 36, 41, 60, 69, 71 Searle Scholars Program, 91, 106 Sigler, Paul B., 66, 67 Slovakia, 32 State University of New York, Stony Brook, 23, 24, 49, 54, 58, 63, 75, 79, 80, 81, 83, 84, 91, 105, 107, 109, 126, 129, 131 Center for Molecular Medicine, 23 Steitz, Thomas A., 66, 67 Stem Cells, 126 Synchrotrons, 45, 46, 47, 48, 49, 50, 80, 81, 117

Technician, 26, 28, 61, 86, 87 Tenure, 24, 83, 108, 125 Theis, Karsten, 27, 84, 86 Thousand Oaks, California, 68 Tonge, Peter J., 89 Toronto, Canada, 92

### U

Т

University of Arizona, 70 University of California, San Diego, 80 University of Illinois, Chicago, 80 University of Massachusetts Amherst, 27, 84 University of Texas Southwestern Medical Center, 122 University of Vermont, 97 University of Vienna, 107 University of Würzburg, 107, 108

## V

Van Houten, Bennett, 124 Verdine, Gregory L., 102 Visas, 32, 91, 92, 93, 94 *Vordiplomprüfungen*, 3

## W

Wellcome Trust, 32 White, Malcolm F., 123 Wolski, Stefanie C., 21, 101 Würzburg, Germany, 9, 16, 17, 36, 61, 111

# Х

Xeroderma Pigmentosum, 101

# Y

Yale University, 67

# Z

Zurich, Switzerland, 3, 22, 23