

CHEMICAL HERITAGE FOUNDATION

**BRUCE J. NICHOLSON**

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview  
Conducted by

Neil D. Hathaway

at

State University of New York at Buffalo  
Buffalo, New York

on

14, 16, 17, and 18 March 1994

From the Original Collection of the University of California, Los Angeles

## **ACKNOWLEDGEMENT**

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**REFORMATTING:**

Kim Phan, Program Intern, Oral History, Chemical Heritage Foundation. B.A. expected 2011, Anthropology, Cornell University.

David J. Caruso, Program Manager, Oral History, Chemical Heritage Foundation. B.A., History of Science, Medicine, and Technology, Johns Hopkins University; PhD., Science and Technology Studies, Cornell University.

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Oral History Program  
University of California, Los Angeles  
Box 951575  
Los Angeles, California 90095-1575

Attention: Janice L. Reiff

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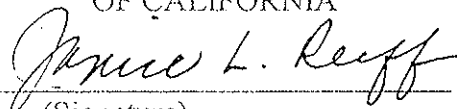
Bruce J. Nicholson  
Department of Biological Sciences  
SUNY at Buffalo  
619 Cooke Hall  
Buffalo, NY 14260

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INTERVIEWEE

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\_\_\_\_\_  
(Signature)

  
\_\_\_\_\_  
(Signature)

Bruce J. Nicholson  
\_\_\_\_\_  
(Typed Name)

Janice L. Reiff  
\_\_\_\_\_  
(Typed Name)

Department of Biological Sciences  
\_\_\_\_\_  
(Address)

Interim Director, Oral History Program  
\_\_\_\_\_  
(Title)

SUNY at Buffalo  
\_\_\_\_\_

\_\_\_\_\_

Buffalo, New York 14260  
\_\_\_\_\_

\_\_\_\_\_

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## BRUCE J. NICHOLSON

1954 Born in Rockhampton, Australia, on 3 February

### Education

1975 B.Sc., Biochemistry, University of Queensland  
1976 1<sup>st</sup> Class Honours, Enzymology, University of Queensland  
1983 Ph.D., Cell Biology, California Institute of Technology

### Professional Experience

1983-1986 California Institute of Technology  
Postdoctoral Fellow

1986-1992 State University of New York at Buffalo  
Assistant Professor, Department of Biological Sciences

1992-1994 Director, Molecular Cell Biology Graduate Program

1992-present Associate Professor

1993-present Research Associate Professor, Department of Biophysical  
Sciences

1994-1996 Co-Director, Center for Advanced Molecular Biology and  
Immunology

1995-present Associate Chair

### Honors

1976 University Medal, Queensland University

1976-1978 Earl C. Anthony Graduate Student Fellowship

1978-1983 Gordon Ross Graduate Student Fellowship

1983-1986 American Heart Association Postdoctoral Fellowship

1988-1992 Pew Scholar in the Biomedical Sciences

### Selected Publications

Nicholson, B.J. et al., 1981. The rat liver gap junction protein: Properties and partial sequence. *Proceedings of the National Academy of Sciences USA*, 78:7594-98.

Nicholson, B.J. et al., 1983. Differences between the proteins of liver gap junctions and lens fiber junctions from rat: Implications for tissue specificity of gap junctions. *Cell*, 32:967-



78.

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- Willecke K. et al., 1991. Mouse connexin 37: Cloning and functional expression of gap junction gene highly expressed in lung. *Journal of Cell Biology*, 114:1049-57.
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- Zhang, J.T. and B.J. Nicholson, 1994. The topological structure of Cx26 and its distribution compared to Cx32 in hepatic gap junctions. *Journal of Membrane Biology*, 139:15-29.
- Suchyna, T.M. et al. Different ionic permeabilities for connexins 26 and 32 produce rectifying gap junction channels. Submitted.
- Zhang, J.T. et al. Membrane integration of *in vitro* translated gap junctional protein: Co- and post-translational mechanisms. Submitted.
- Garcia, A.M. et al. Prevention of pp60<sup>v-src</sup> transformation of growth in NRK cells by expression of a src-resistant connexin-Cx32. In preparation.
- Kadle, R. et al. Distribution of gap junction proteins among cell types in primary cultures of rat CNS: Connexin 43 in neuronal-neuronal and neuronal-glial coupling. In preparation.
- Cao, F.L. et al. Quantitative analysis of differential permeabilities of connexins 32, 26 and 45 to dyes of different charge. In preparation.
- Rosinski, C.R. and B.J. Nicholson. A mutagenic approach to defining the structure of the docking/adhesion domains of gap junctions. In preparation.

## ABSTRACT

**Bruce J. Nicholson** was born in Rockhampton, Queensland, Australia, in the middle of a hurricane, but was raised, principally, in Brisbane, the younger of two brothers. His mother was a bank teller until she wed; his father was in insurance sales until he opened his own insurance loss adjuster consultancy. Both of his parents believed in the value of a good education and encouraged both sons to excel, though in whatever direction they chose. Nicholson had a normal childhood, and learned that he had some athleticism (running track for some time). He had a general interest in science and focused on that through school, and he also enjoyed participating in school plays and debate.

He matriculated at the local university (staying local was quite common in Australia), the University of Queensland from which he received his baccalaureate in science. He had his first independent research experience in John Mansbridge's laboratory, during which time he learned that he did not have the best experimental "hands"; he went on to be mentored by Burt Zerner, an enzymologist, and Robert L. Blakely, completing an honors thesis on inhibition kinetics in jack bean urease in Zerner's lab. Wanting to do graduate studies in the United States Nicholson applied to several universities, including the California Institute of Technology (Caltech) at which his brother had already matriculated for his graduate studies. He was accepted at Caltech and decided to pursue studies in neurobiology; he was initially assigned to do a rotation with John D. Pettigrew on horseradish peroxidase retroactive tracing of neuronal pathways, but then moved on to work with Jean-Paul Revel researching gap junction proteins. Nicholson remained at Caltech for his postdoctoral studies, and also worked with Norman Davidson; he sequenced connexin 26. From Caltech he moved on to a faculty position at the State University of New York, Buffalo, where he worked with Daniel B. Gros to publish evidence of the existence of more than one gap junction protein

For the remainder of the interview, Nicholson talks about trying to alert the scientific community to the importance of gap junction research; difficulties in crystallizing gap junction proteins; his collaboration with Klaus Willecke, and the generosity of David L. Paul, Eric C. Beyer, and Willecke; and his policies on authorship in collaborations. He ends the interview with a discussion of the benefits of being a Pew scholar; the importance of electrophysiology in gap junction research; using mutagenesis to analyze the structure and function of connexins; the relationship of cell coupling to cell transformation; and the importance of his wife and family.

## UCLA INTERVIEW HISTORY

### INTERVIEWER:

Neil D. Hathaway, Interviewer, UCLA Oral History Program. B.A., English and History, Georgetown University; M.A. and C. Phil., History, UCLA.

### TIME AND SETTING OF INTERVIEW:

**Place:** Nicholson's office, State University of New York at Buffalo.

**Dates, length of sessions:** March 14, 1994 (32 minutes); March 16, 1994 (155 minutes); March 17, 1994 (68 minutes); March 18, 1994 (115 minutes).

**Total number of recorded hours:** 6.2

**Persons present during interview:** Nicholson and Hathaway.

### CONDUCT OF INTERVIEW:

This interview is one in a series with Pew scholars in the biomedical sciences conducted by the UCLA Oral History Program in conjunction with the Pew Charitable Trusts's Pew Scholars in the Biomedical Sciences Oral History and Archives Project. The Project has been designed to document the backgrounds, education, and research of biomedical scientists awarded four-year Pew scholarships, from 1988 through 1992.

In preparing for this interview, Hathaway, in consultation with the director of the UCLA Oral History Program and three UCLA faculty project consultants, developed a topic outline to provide an overall interview framework. Hathaway then held a telephone preinterview conversation with Nicholson to obtain extensive written background information (curriculum vitae, copies of published articles, etc.) and agree on a research and interviewing timetable.

Hathaway further reviewed the documentation in Nicholson's file at the Pew Scholars Program office in San Francisco, including his proposal application, letters of recommendation, and reviews by Pew Scholars Program national advisory committee members. For general background on the recent history of the biological sciences, Hathaway consulted such works as: J.D. Watson et al., *The Molecular Biology of the Gene*. 4th ed. 2 vols. Menlo Park, CA: Benjamin/Cummings, 1987; Lubert Stryer, *Biochemistry*. 3d ed. New York: W.H. Freeman, 1988; *The Journal of the History of Biology*; H.F. Judson, *The Eighth Day of Creation: Makers of the Revolution in Biology*. New York: Simon and Schuster, 1979; and recent issues of *Science*, *Nature*, and *Cell*.

The interview is organized chronologically, beginning with Nicholson's childhood in Brisbane and continuing through his education at University of Queensland and California Institute of Technology and his career at State University of New York at Buffalo. Major topics discussed include the gap between mathematical and biological sciences, Nicholson's mentors, the setup of his lab, collaborations, and studying the structure and function of gap junctions.

## ORIGINAL EDITING:

Vimala Jayanti, editor, edited the interview. She checked the verbatim transcript of the interview against the original tape recordings, edited for punctuation, paragraphing, and spelling, and verified proper names. Words and phrases inserted by the editor have been bracketed.

Nicholson reviewed the transcript. He verified proper names and made minor corrections.

Kristian London, assistant editor, prepared the table of contents and the interview history. Steven J. Novak, senior editor, assembled the biographical summary.

Gregory M. Beyrer, editorial assistant, compiled the index.

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