

CHEMICAL HERITAGE FOUNDATION

**DARLEANE CHRISTIAN HOFFMAN**

Transcript of Interviews  
Conducted by

Hilary L. Domush

at

Hoffman's home  
Oakland, California

on

28 and 29 February 2012

(With Subsequent Corrections and Additions)

CHEMICAL HERITAGE FOUNDATION  
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## DARLEANE CHRISTIAN HOFFMAN

1926 Born in Terril, Iowa, on 8 November

### Education

1948 BS, Chemistry/Math, Iowa State College, Ames, Iowa

1951 PhD, Physical (Nuclear) Chemistry, Iowa State College, Ames, Iowa

### Professional Experience

1952-1953 Oak Ridge National Laboratory, Oak Ridge, Tennessee  
Chemist

1953-1978 Los Alamos Scientific Laboratory, Los Alamos, New Mexico  
Staff Member, Project Leader, Associate Group Leader

1979-1982 Los Alamos National Laboratory, Los Alamos, New Mexico  
Division Leader, Chemistry-Nuclear Chemistry Division

1982-1984 Division Leader, Isotope and Nuclear Chemistry Division

1978-1979 Lawrence Berkeley National Laboratory, University of California,  
Guggenheim Fellow

1984-1996 Faculty/Sr. Scientist, and Group Leader, Heavy Element Nuclear  
and Radiochemistry

1996-2001 Faculty/Sr. Scientist, and Co-Group Leader

2002-present Faculty/Sr. Scientist, Nuclear Science Division

1984-1991 University of California, Berkeley, Berkeley, California  
Professor of Chemistry (Nuclear), Department of Chemistry

1991-1993 Professor Emerita, Department of Chemistry

1994-2010 Professor of the Graduate School

2010-present Professor Emerita

1991-1996 Lawrence Livermore National Laboratory, Livermore, California  
Co-founder and Charter Director, Seaborg Institute for  
Transactinium Science

1996-2007 Senior Research Advisor, Seaborg Institute for  
Transactinium Science

### Honors

1964-1965	Senior NSF Postdoctoral Fellowship, Oslo, Norway
1976	American Chemical Society Central New Mexico Section John Dustin Clark Award for Meritorious Service to Chemistry in New Mexico
1978	Iowa State University Alumni Citation of Merit of College of Sciences and Humanities
1982	Guest lecturer, Institute of Atomic Energy, Beijing, Lanzhou, Shanghai, Peoples Republic of China, 16 October-3 November 3
1983	American Chemical Society Award for Nuclear Chemistry
1986	Iowa State University Alumni Association Distinguished Achievement Award
1986	Fellow, American Physical Society
1987	Japan Society for Promotion of Science Fellowship (July-August)
1988	National Honor Initiate & Speaker, Alpha Chi Sigma National Conclave
1990	American Chemical Society Francis P. Garvan–John M. Olin Medal Lecture, “Physics and chemistry of the heaviest elements”
1990	Norwegian Academy of Science and Letters, elected to membership
1990-present	Director’s Fellow, Los Alamos National Laboratory
1994	Fellow, American Association for the Advancement of Science
1996	Berkeley Citation of University of California, Berkeley
1997	US National Medal of Science
1998	ACS Representative and invited lecturer at Polish Chemical Society meeting in honor of 100 <sup>th</sup> anniversary of the discovery of radium and polonium by Marie Sklowdoska Curie, Wroclaw, Poland
1998	Fellow, American Academy of Arts and Sciences
1998	Frontiers of Science Award of Society of Cosmetic Chemists and Invited Lecturer, New York City
1998	University of California Berkeley, College of Chemistry Commencement Address
1998-2005	Lecturer for Actinide Science Summer School sponsored by Seaborg Institute for Transactinium Science, Lawrence Livermore National Laboratory and Lecturer for ACS Division of Nuclear Chemistry and Technology sponsored summer schools in Nuclear and Radiochemistry, San Jose State University
2000	American Chemical Society Priestley Medal
2000	WITI (Women in Technology International) Hall of Fame
2000	Honorary Doctorate, Clark University
2001	Honorary Doctorate, University of Bern, Switzerland
2001	Welch Foundation Lecturer (March)
2001	Harry and Carol Mosher Award of the Santa Clara, California Section, American Chemical Society
2002	Induction into Alpha Chi Sigma Hall of Fame
2003	Sigma Xi William Procter Award for Scientific Achievement
2003	Radiochemistry Society Lifetime Award for Devotion to Radiochemistry Science and Education

2004	Honorary International Member, Japan Society of Nuclear and Radiochemical Sciences
2007	Recipient of J. V. Atanasoff Search and Discovery Alumni Award from College of Liberal Arts and Sciences, Iowa State University, Ames, Iowa
2007-2009	Member, President's Selection Committee for the National Medal of Science Awards
2008	Invited presentation on " <i>The Crisis in Radiochemistry and Nuclear Chemistry Education</i> " for the Nuclear Forensics Advisory Panel, Washington, D.C.
2010	Hevesy Medal Award (received 2011)
2015	Los Alamos Medal, Los Alamos National Laboratory

### Research and Mentoring

Under Hoffman's tutelage, nineteen students received PHD degrees and three received MS degrees. She hosted many postdoctoral fellows who went on to prestigious positions in both the US and abroad. She initiated many international collaborations at Berkeley to study nuclear and chemical properties of transplutonium elements and traveled abroad to some thirty-eight countries as lecturer and visiting scientist.

## ABSTRACT

**Darleane (Christian) Hoffman** was born in Terril, Iowa, one of two children. She grew up “all over” Iowa as her father was a public school superintendent who soon moved to Coon Rapids and then to West Union. Her mother, a housewife, had studied oratory and music in college and encouraged Darleane’s participation in both vocal and instrumental music. Mathematics was her favorite subject in high school. The family often spent summer vacations at the Iowa ‘Great lakes’ where her father found summer employment and she learned to swim and developed her life-long love of swimming.

She graduated in 1944 as co-valedictorian of her class and decided to enter Iowa State College, Ames, Iowa to study applied art. Fortunately, Prof. Nellie Naylor’s required freshman chemistry class changed her mind. Hoffman found chemistry “the most interesting, most logical, most useful” possible subject. In addition to classwork Darleane also waited tables, continued to swim, and sang in church and dormitory choirs. During her senior year, she began undergraduate research with Prof. Don Martin at the newly completed Synchrotron, and continued research for her PhD there. She met Physics student Marvin Hoffman in 1948 and they both pursued research at the Synchrotron. Darleane received her PhD in only three years. She married Marvin six days after receiving her PhD in December 1951.

Marvin stayed in Iowa to finish his PhD, while in January 1952 Darleane took a position at Oak Ridge National Laboratory in Tennessee to help support them. Marvin finished his degree later that year and accepted a position at Los Alamos Scientific Laboratory, New Mexico where Darleane was also promised a position in the Radiochemistry Division. There was nothing in writing and Darleane encountered numerous roadblocks, including being told “We don’t hire women in that Division” to having her Q-clearance lost. Finally, in March 1953 Darleane managed to join Dr. Roderick Spence’s Radiochemistry group. It was an exceedingly productive time for her and she published many papers on radiochemical separations and the discovery of Plutonium-244 in nature.

During the years in Los Alamos, she also had two children, returning to work immediately, spent a sabbatical year in Norway, received a Guggenheim award to work in Berkeley with Glenn Seaborg, and became the first woman technical division leader.

In 1984 Hoffman was offered a tenured professorship in the Chemistry Department at UC Berkeley, the second woman full professor, and became Heavy Element Nuclear and Radiochemistry Group Leader at Lawrence Berkeley National Laboratory. And after thirty years, she left Los Alamos to help educate the next generation of nuclear and radiochemists. Her group confirmed the discovery of element 106, enabling the discoverers to propose the name Seaborgium and she led the struggle with IUPAC to finally confirm it in 1997. She regards co-founding the Seaborg Institutes for Transactinium Sciences with Christopher Gatrousis and Glenn Seaborg at Livermore in 1996 and later at Berkeley and Los Alamos, as one of her most important contributions.

Hoffman continues to write papers, give addresses, and receive awards, among them the cherished 1997 National Medal of Science (her seven year-old granddaughter attended the ceremony) and the Priestley Award (the highest ACS award) in 2000. Marie Curie has always been a role model for her. To conclude her interview she cautions young people to choose a supportive and helpful spouse or significant other. She thanks her mother and husband for their gracious and extraordinary help and support which made her career possible.

## INTERVIEWER

**Hilary L. Domush** was a Program Associate in the Center for Oral History at CHF from 2007-2015. Previously, she earned a BS in chemistry from Bates College in Lewiston, Maine in 2003. She then completed an MS in chemistry and an MA in history of science both from the University of Wisconsin-Madison. Her graduate work in the history of science focused on early nineteenth-century chemistry in the city of Edinburgh, while her work in the chemistry was in a total synthesis laboratory. At CHF, she worked on projects such as the Pew Biomedical Scholars, Women in Chemistry, Atmospheric Science, and Catalysis.



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Early Years	1
<p>Born in Terril, Iowa. Father superintendent of schools, mother housewife. Move to Coon Rapids, Iowa. Music. Move to West Union, Iowa, for high school. Father coach of girls' basketball team. Visited grandparents. Maternal grandfather inventor of farm implements. Great Depression and Dust Bowl. Father and uncle ran gas station in summers. Swimming in Iowa's Great Lakes. Always liked math; no chemistry class in her high school, just physics. College always assumed. Valedictorian.</p>	
College and Graduate School Years	14
<p>Went to Iowa State University for applied art. Required chemistry class taught by Nellie Naylor inspired her to change majors. Had to work harder in college. Waited tables and was counselor in dormitory. Choir. V-12 College Training Program; ratio of men to women four to one. Entered Donald Martin's lab at Atomic Research Institute; split mica for radiation detectors. Marvin Hoffman in her statistics class. Father's death. Helped mother move to Waterloo, later to Ames. Chose to stay in Iowa; liked her research. PhD in three years. Written and oral exams in four subjects. Only two women; never felt discrimination. Worked on platinum compounds for nuclear pharmaceuticals. Married six days after receiving PhD. Worked with husband at synchrotron.</p>	
Oak Ridge, Tennessee, Years	31
<p>Job offer at Oak Ridge National Laboratory (ORNL). Husband still in Ames to finish PhD. Worked on Aircraft Nuclear Propulsion Project. David and Elizabeth Cuneo. Husband sneaked into Iowa State library to correct spelling error in her dissertation. No nuclear physics work for husband at Oak Ridge, so he took job at Los Alamos National Laboratory (LANL). Moving to New Mexico.</p>	
Los Alamos National Laboratory Years	33
<p>Told no women permitted to work in test division. Roderick Spence; needed her to work on plutonium debris analysis. She had Q clearance from Oak Ridge but personnel at LANL could not find it; took two months to get started at job. Several women in Spence's group. George Cowan new boss. Wanted to establish career and have house before kids. Husband went to test sites often. She worked until giving birth, then back immediately. A year in Norway. Became division head after her Guggenheim year with Glenn Seaborg at University of California, Berkeley.</p>	
Moving to California	44
<p>Offered a tenured professorship in the Chemistry Department at UC Berkeley. Became leader of the Heavy Element Nuclear and Radiochemistry Group at LBNL after Seaborg's retirement. Leaving LANL. Seaborg's mentoring.</p>	

Teaching new to her. Recruiting graduate students. Diana Lee's lab management. Promoted collaboration among her students. Publishing. LANL work classified, but published paper on half-life of plutonium 238 and discovered naturally-occurring plutonium 244. Japan lecture tour. Hiromichi Nakahara to her lab. Remnants of World War II attitudes. Initiated and fostered international collaborations.

## Accomplishments

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Nuclear medicine field doing well; nuclear and radiochemistry less well; Iowa State closed synchrotron. Applications of nuclear and radiochemistry other than medical. Instrumentation aspects. Founding the Glenn T. Seaborg Institute, first at Livermore; later at Berkeley and Los Alamos. Christopher Gatrousis' and others' involvement. Symposium to celebrate Seaborg's one hundredth birthday. Purpose of the Institutes. Outreach from national labs to universities. Funding. Summer schools at San Jose State University and Brookhaven National Laboratory.

## Retirement

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Still has ties to Institutes; organizing symposia; still writing papers. Opinions about education today. Advice to young people. Many awards. Second woman to get Priestley Medal, first to get American Chemical Society's Nuclear Chemistry Award. Discussion of discrimination against women in field; importance of having a good mentor. ACS's role in promoting women. Marinda Wu, President of ACS. Obtaining salary parity at LANL. Symposium for Albert Ghiorso, discoverer of twelve elements. Editor and co-author of *Transuranium People*. Co-organizer of ACS symposium on Marie Curie in 2011. 1998 Commencement address to College of Chemistry at Berkeley; first woman to do so. Seaborgium pin to commemorate confirmation of discovery and choice of name.

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