

CHARLOTTE FROESE FISCHER (1929-2024)¹



Charlotte Froese Fischer, a Guest Researcher at the National Institute of Standards and Technology (USA) and Affiliate Professor at the University of British Columbia (Canada), passed away on February 8th, 2024.

Charlotte Froese Fischer was born on September 21, 1929 in the Ignatyev Mennonite Settlement of Nikolayevka in the Donetsk region of Ukraine. Within a few months, her village was displaced, and her family emigrated to Germany as refugees before continuing to Canada to settle down, ultimately in the province of British Columbia.

Charlotte studied mathematics, applied mathematics, and chemistry at the University of British Columbia (UBC). She already published her first paper on calculated diffraction patterns of dielectronic rods at centimetric wavelengths in 1954. Her career took a turn towards atomic physics when she was accepted for a Ph.D. program at Cambridge University under the supervision of Douglas R. Hartree. In 1957 Charlotte defended her thesis on solving the Hartree-Fock (HF) equations with computers. Since then, she has been widely recognized as the world-leading researcher on atomic structure calculations.

Over the next ten years, Charlotte worked as a professor in the Department of Mathematics at UBC, visiting various institutions during summers. In 1964, she became the first woman to be awarded an Alfred P. Sloan Foundation Research Fellowship. Charlotte married Patrick C. Fischer, a fellow mathematician and computer scientist, in 1967, and together they moved to the University of Waterloo, then Penn State University, and finally Vanderbilt University, where she was primarily appointed in computer science. However, her major research has always been in the development of powerful numerical methods related to atomic structure calculations. Even after formal retirement, Charlotte never stopped working in this field. For the past 20 years, she was a Guest Researcher at the Atomic Spectroscopy Group at NIST, with a five-year break when she moved back to Canada as an Affiliate Professor at UBC.

Charlotte published more than 300 papers that formed a true foundation for modern computational atomic physics of multi-electron atoms and ions. It is impossible to overestimate her contributions to the development of multi-configuration Hartree-Fock and Dirac-Hartree-Fock methods in atomic structure. Her classic books “The Hartree-Fock Method for Atoms” and “Computational Atomic Structure: An MCHF Approach” (with T. Brage and P. Jönsson) have become the most important textbooks on this topic.

¹ Adapted from a tribute published in the TAMOC Newsletter <https://sites.google.com/site/tamocphysics/home>

In 1990, Charlotte was elected a Fellow of the American Physical Society “For developing the numerical approach to the Hartree-Fock method for atoms; for providing benchmark oscillator strengths; for discovery of the calcium negative ion” [1].

She was also elected a member of the Royal Physiographic Society in Lund and a foreign member of the Lithuanian Academy of Sciences. In 2015, she was awarded an Honorary Doctorate from Malmö University, Sweden. The University of Western Ontario bestowed that honor in 2018.

Charlotte was a talented and generous unifier and promotor of all postdoctoral researchers she supervised over the years, as demonstrated by the expanding international Collaboration on Computational Atomic Structure (CompAS) (<https://compas.github.io>) that quickly became her academic family. In her role as the natural leader of the collaboration, she has been the inspiration of many young scientists.

Charlotte was a generous supporter of charitable causes related to education, nature, women, and development. After Patrick's death, she endowed the Patrick C. Fischer chair in theoretical computer science at the University of Michigan. At University of Toronto, she established a graduate scholarship in honor of Beatrice “Trixie” Worsley, Canada's first computer scientist. She supported UBC with a student mobility award, recognizing the importance of the scholarship that took her to Cambridge, and created a graduate award to further computational physics at the University of Ottawa. Patrick and Charlotte also created a scholarship fund at Vanderbilt.

Charlotte Froese Fischer is dearly missed by all who knew her.

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REFERENCES

1. https://www.aps.org/funding-recognition/aps-fellowship?award_fellowship%5Bquery%5D=Charlotte%20Froese%20Fischer