

Chrysovalantis Constantinou

Research Profile

Interdisciplinary nuclear physicist with experience in *ab initio* nuclear theory, machine learning, and scientific software development. Research spans nuclear structure and computational quantum many-body methods, medical imaging AI, and forensic anthropology, with contributions across fundamental physics, applied machine learning, and open-science infrastructure.

Research Interests

Ab initio nuclear theory; nuclear structure; computational quantum many-body methods; algebraic and group-theoretical approaches; machine learning predictions of nuclear potential energy surfaces; machine learning applications in physics and osteoarchaeology; medical imaging AI; scientific software and data-driven modeling; high-performance computing.

Academic and Professional Appointments

Independent Researcher	2025–present
Visiting Researcher , Université Libre de Bruxelles	May–June 2025
Postdoctoral Research Fellow , The Cyprus Institute (CaSToRC)	Sept–Nov 2024
Part-time Teacher of A-Level Physics , International School of Paphos	Aug 2023–Apr 2024
Associate Research Scientist , The Cyprus Institute (STARC)	Jan 2023–Aug 2024
Computational Scientist , The Cyprus Institute (CaSToRC)	Oct 2019–Dec 2022
Visiting Assistant Professor of Physics , Monmouth College	Jan 2018–Sept 2019
Postdoctoral Research Associate , Yale University	Oct 2016–Dec 2017
Graduate Assistant , University of Notre Dame	Aug 2009–Sept 2016

Education

Ph.D. in Physics , University of Notre Dame, USA	2017
Thesis: <i>Natural orbitals for the no-core configuration interaction approach</i>	
M.S. in Physics , University of Notre Dame, USA	2014
Diploma in Applied Mathematics and Physical Sciences , National Technical University of Athens, Greece	2009

Publications

Classifying Legal Age of Majority (≥ 18 years) from Panoramic Radiographs with Transfer Learning: Benchmarking ViT and EfficientNetV2. Ch. Constantinou, P. Georgiades, N. Angelakopoulos, A. Hadzic Selmanagić, E. Dervišević, M. Moukarzel, A. Franco, R. Merdietio Boedi. *Journal of Forensic and Legal Medicine*, 122, 103215 (2026)

Skeletal Sex Estimation for Human Remains From Archaeological Contexts: Machine Learning Models Based on Ancient Dion, Greece. Ch. Constantinou, E. Nikita, P. Tritsaroli. *International Journal of Osteoarchaeology*, 35(4), 162–178 (2025)

Testing the accuracy of the SexEst software for sex estimation in a modern Greek sample. P.-A. Nikita, N. Garoufi, E. Valakos, Ch. Constantinou, E. Nikita, M.-E. Chovalopoulou. *International Journal of Osteoarchaeology*, 34(2), e3283 (2024)

AgeEst: An open access web application for skeletal age estimation employing machine learning. Ch. Constantinou, M.-E. Chovalopoulou, E. Nikita. *Forensic Science International: Reports*, 7, 100317 (2023)

Natural orbitals for the *ab initio* no-core configuration interaction approach. P. J. Fasano, Ch. Constantinou, M. A. Caprio, J. P. Vary, P. Maris. *Physical Review C*, 105, 054301 (2022)

SexEst: An open access web application for metric skeletal sex estimation. Ch. Constantinou, E. Nikita. *International Journal of Osteoarchaeology*, 32(4), 832–844 (2022)

Natural orbital description of the halo nucleus ${}^6\text{He}$. Ch. Constantinou, M. A. Caprio, J. P. Vary, P. Maris. *Nuclear Science and Techniques*, 28, 179 (2017)

Generalized seniority with realistic interactions in open-shell nuclei. M. A. Caprio, F. Q. Luo, K. Cai, Ch. Constantinou, V. Hellemans. *Journal of Physics G*, 39, 105108 (2012)

Generalized seniority for the shell model with realistic interactions. M. A. Caprio, F. Q. Luo, K. Cai, V. Hellemans, Ch. Constantinou. *Physical Review C*, 85, 034324 (2012)

Characterization of the neutron flux distribution at the Athens Tandem Accelerator NCSR Demokritos. R. Vlastou, M. Kokkoris, M. Diakaki, Ch. Constantinou, C. A. Kalfas, A. Kotrotsou, A. Lagoyannis, M. Lambrou, V. Loizou, E. Mara, V. Paneta, G. Provatas, A. Tsinganis. *Nuclear Instruments and Methods in Physics Research B*, 269, 3266 (2011)

Conference Proceedings

Generalized seniority in a major shell with realistic interactions. M. A. Caprio, F. Q. Luo, K. Cai, Ch. Constantinou, V. Hellemans. In *Beauty in Physics: Theory and Experiment*, ed. R. Bijker et al., *AIP Conference Proceedings*, No. 1488 (AIP, Melville, NY, 2012), p. 212

Invited and Conference Talks

Linking Ancient Cities: Network Analysis of the Roman Transportation System. American Physical Society April Meeting, Sacramento & Virtual, California, April 2024

NI4OS-Europe via an example service: SexEst. Hungarian Open Science Forum, Virtual, Hungary, October 2022

Open access web application for metric skeletal sex estimation. EOSC Regional Event, Budapest, Hungary, September 2022

FAIR data and FAIR principles. NI4OS-Europe End-Users Training Event, Nicosia, Cyprus, June 2022

Deploying machine learning models for forensic anthropological applications with Docker and Streamlit. DockerCon 2022, Virtual, USA, May 2022

Open science and FAIR principles. NI4OS-Europe Capacity-Building Event, Nicosia, Cyprus, October 2020

Natural orbitals for the no-core configuration interaction approach. Workshop on *ab initio* Nuclear Theory, Ames, Iowa, December 2017

Cluster orbitals for the mirror nuclei ${}^7\text{Li}$ and ${}^7\text{Be}$. APS Division of Nuclear Physics Meeting, Pittsburgh, Pennsylvania, October 2017

***Ab initio* no-core configuration interaction calculations of electromagnetic observables for *p*-shell nuclei.** APS Division of Nuclear Physics Meeting, Vancouver, British Columbia, Canada, October 2016

Accelerating the convergence of no-core configuration interaction calculations using natural orbitals. Midwest Theory Get-Together, Argonne National Laboratory, Illinois, September 2016

***Ab initio* no-core configuration interaction calculations in the natural orbital basis.** APS Division of Nuclear Physics Meeting, Santa Fe, New Mexico, October 2015

The natural orbital basis for no-core configuration interaction calculations. Midwest Theory Get-Together, Argonne National Laboratory, Illinois, September 2015

Scaling properties for no-core configuration interaction calculations using the harmonic oscillator basis and the JISP16 interaction. American Physical Society April Meeting, Savannah, Georgia, April 2014

Teaching Experience

Advanced Electromagnetism; Classical Mechanics; Mathematical Methods for Physicists; Introductory Physics I–II; Review of Fundamental Physics II; AS and A-Level Physics

Professional Service

Reviewer for *PLOS ONE* and *IEEE Journal of Biomedical and Health Informatics*.

Co-lead, NI4OS-Europe Work Package on Open Science and FAIR Data

Military Service

Cypriot National Guard, Sergeant, Army Corps

2001–2003

Awards

State Scholarship Foundation of Greece, awarded for highest entrance examination score to the School of Applied Mathematics and Physical Sciences, NTUA (2003).

Outreach

Art Exhibitions: Art Week Volterra 2025; La Grande Bellezza Award, Volterra, Italy.

Public Lecture: *Nuclear physics and the many-body problem*, Yale Young Scholars Program, New Haven, USA, 2017.

References

Available upon request.