

## José Nicolás Orce (Full Professor)

### Fundamental Nuclear Physics and Applications

Address: Department of Physics & Astronomy, University of the Western Cape, Cape Town, South Africa

Phone: +27 21-959-3454 (office)

Email: [jnorce@uwc.ac.za](mailto:jnorce@uwc.ac.za) / [nico.orce@cern.ch](mailto:nico.orce@cern.ch)

Born: 01/10/1972, Almuñécar (Spain)

Marital Status: Married

Website: <https://nuclear.uwc.ac.za>

YouTube: <https://www.youtube.com/c/NicoOrce>

ORCID ID: 0000-0003-1699-1761

GitHub: <https://github.com/UWCNuclear>

h-index / 10-index: 21 / 44 (Google Scholar)

Citations: 3120

Peer-reviewed publications: 150+

Grant secured funds: +2.75 Million EUR



### EDUCATION / CAREER

- **Licenciatura (5 Years Degree) in Fundamental Physics** (1993 -1999)  
University of Granada (Granada, Spain)
- **Electronics Engineering** (1999) Electromagnetic Pulse (EMP), Nuclear Origin and Effects in Electronic Devices (Shielding Theory), Universidad de Granada (Granada, Spain)
- **Ph.D. in Experimental Nuclear Physics** (2000 - 2003)  
“Multi-quasiparticles and shape-driving effects in  $^{128}\text{Xe}$ ,  $^{127}\text{I}$  and  $^{125}\text{Sb}$ ”, University of Brighton (Brighton, East Sussex, UK)
- **Postdoctoral Scholar** (2003 - 2006)  
University of Kentucky, Lexington (Kentucky, USA)
- **Research Associate** (2006 - 2007)  
University of Kentucky, Lexington (Kentucky, USA)
- **Assistant Professor** (2007)  
Eastern Kentucky University, Richmond (Kentucky, USA)
- **Postdoctoral Research Fellow at TRIUMF** (2008 - 2010)  
Canadian National Facility for Nuclear and Particle Physics (Vancouver, Canada)
- **Lecturer in Physics** (2011-2012)  
Physics Department, University of the Western (Cape Town, South Africa)
- **Associate Professor in Physics** (2012-2016)  
Physics Department, University of the Western Cape (Cape Town, South Africa)
- **Full Professor in Physics** (2017-2021)  
Physics & Astronomy Department, University of the Western Cape (Cape Town, South Africa)

### INVITED TALKS & SEMINARS (2018-2021)

- **Recent Issues with 3N forces, Nuclear Clusters and Shell Model**, International Conference on Recent Issues in Nuclear and Particle Physics (RINP2), Visva-Bharati University, Santiniketan, India (2019).
- **How do we Infer Shell Effects @ High-Excitation Energies?** International Conference on Nuclear Structure and Dynamics (NSD), Venice, Italy (2019).
- **Coulomb-excitation studies @ iThemba LABS**, ANSTT2 Workshop, iThemba LABS (2019).
- **Nuclear Polarizability Effects in Coulomb-Excitation Studies of Light and Medium-Mass Nuclei**, 3<sup>rd</sup> GOSIA Workshop, Heavy Ion Laboratory, University of Warsaw, Warsaw, Poland (2018).
- **Review of SA Physics at ISOLDE from UWC's Perspective**, SA-CERN 10-Year Celebration (2018)
- **Nuclear Polarizability Effects @ Low Excitation Energies**, The 6<sup>th</sup> International Conference on Collective Motion in Nuclei under Extreme Conditions (COMEX6), Cape Town (2018).
- **Breaking Heavens Code: How Were/Are the Elements Made?** XIII (2018) and Xth (2020) Tastes of Nuclear Physics.
- **Synergy between Nuclear Physics and SKA**, Mini-Workshop on Gravitational Waves, Radio Astronomy and Nuclear Physics, SKA-SALT-Nuclear Collaboration Meeting, UWC (2018).
- **When Atomic Nuclei Polarize**, Isospin, Structure, Reactions and energy Of Symmetry (ISTROS), Slovakia (2018).
- **Colloquia, Webinars & Lectures given at** Panjab University (India), iThemba LABS (SA), University of Cape Town (SA), Instituto de Física Corpuscular (IFIC, Valencia), TRIUMF (Canada), Nelson Mandela University (SA), Cambridge University (UK), CERN (Switzerland), University of York (UK), NITheCS (SA), University of Notre Dame (USA).
- **Presentations given by my Students and Postdocs**: S Masango (2xISOLDE Workshop, CAGRA Workshop, Japan, Tastes, SAIP), K Abrahams (2xISOLDE Workshop, SAIP, ANSTT2, Tastes), C Ngwewtsheni (SAIP, ANSTT2, Tastes, iThemba LABS, RINP2, India, Hyperfine Interactions, India), K Kapoor (Hyperfine Interactions, India, Tastes), B Lomberg (First Stars, Brazil, Tastes, ANSTT2), M Mokgolobotho (SAIP, Tastes, 4<sup>th</sup> SA-JINR, Dubna), C Mehl (Nuclear Structure 2016, USA, iThemba LABS, 4<sup>th</sup> SA-JINR, Dubna), N Bernier (Tastes), K Raju (4<sup>th</sup> SA-JINR, Dubna, DAE-BRNS, India, SAIP). E Akakpo and D Mavela (Tastes of Nuclear Physics, South African Institute of Physics),

## TEACHING & LEARNING

- **ASTRONOMY 192, Stars, Galaxies and the Universe** (University of Kentucky, Summer 2006). Complete course responsibility: lecturing, writing examinations, assigning course grades. Course Evaluation: 3.4/4.
- **ASTRONOMY 130, In Quest of the Universe** (Eastern Kentucky University, Spring 2007). Complete course responsibility: lecturing, writing examinations, assigning course grades. No evaluation.
- **PHYSICS 231: Classical Mechanics and Waves** (University of Kentucky, Summer 2007). Complete course responsibility: lecturing, writing examinations, assigning course grades. Course Evaluation: 3.1/4.
- **Teaching at the University of the Western Cape:**
  1. PHY312 (3<sup>rd</sup> year): Quantum Mechanics and Nuclear Physics (2011-2019).
  2. PHY322 (3<sup>rd</sup> year): Energy (2013).
  3. Nuclear Structure Physics (MaNus Honours) (2011-2020).
  4. Computer Skills (2011-2021).
  5. Statistical Physics / Honours (2018).
  6. PHY111 (1<sup>st</sup> year): Introductory Physics (2020-21).  
Videos of the Lectures @ <https://www.youtube.com/c/NicoOrce>
- **Online Mini-Schools on Mathematical Modelling of Covid-19, Coulomb excitation, etc.**

## RESEARCH

- **Nuclear Physics Experiments carried out during 2016-2019:**  
Leading experiments at iThemba LABS.  
Leading experiments @ ISOLDE Decay Station and HIE-ISOLDE (CERN).  
Leading experiment at TRIUMF (Vancouver Canada) in July 2018.  
First Coulomb-excitation of <sup>12</sup>C using high-intense beams at Maier-Leibniz-Laboratory (Munich) ran in May 2018.  
First pre-GAMKA experiment ran successfully at iThemba LABS in October 2019.  
Development of the Modern African Nuclear DEtector LABoratory at UWC (to be commissioned in 2020).
- **Other Nuclear Physics Experiments and Astronomy observations carried out previously at:**  
The Australian National University, GANIL, Yale University, University of Notre Dame, University of Cologne, Duke University, University of Kentucky, Universität Stuttgart, TRIUMF, Argonne National Laboratory, University of Washington, iThemba LABS, HIE-ISOLDE/CERN and SALT (astronomy of metal-poor stars).
- **Referee**  
Physical Review C (American Physical Society), Journal of Physics G (Institute of Physics), European Journal of Physics A and EPJ Web of Conferences (Springer), Physics Letters B, Vacuum, and Applied Mathematical Modeling (Elsevier). SAIP (South African Institute of Physics), Canadian Journal of Physics,
- **MSc and PhD Thesis Examiner.**  
J Easton (MSc, UWC), SS Ntshangase (PhD, UCT), MA Stankewicz (PhD, UCT), PL Masiteng (PhD, UWC), S Bvumbi (PhD, UJ), BV Kheswa (PhD, SU), K Lee (PhD, SU), B Zikhali (MSc UniZulu), SH Mthembu (MSc, UniZulu).
- **Member of the Program Advisory Committee at iThemba LABS (2016-17).**
- **Chair of Physics Users at iThemba LABS (2016-17).**
- **Chair of the Tastes of Nuclear Physics (2011-2021): 9<sup>th</sup> edition hosted at the University of Zululand (~150 attendees).**  
Videos of the Talks @ <https://www.youtube.com/c/NicoOrce>
- **NITheCS (National Institute for Theoretical and Computational Sciences) Associate.**

## PI RESEARCH GRANTS (TOTAL >R50M = €2.75M)

- **Spokesperson and Grant Holder for GAMKA: NRF Strategic Research Equipment (>R35M)**  
<https://www.nrf.ac.za/media-room/news/nrf-funds-state-art-nuclear-spectrometer-uwc>
- **UWC's GAMKA Related Research (R250k) , Prestige Postdoc (R500k) and Equipment Funds (250k)**
- **NRF Program for Competitive Rated Researchers (R800k)**
- **NRF/DST Conference Funds: IX Tastes of Nuclear Physics @ UniZulu (R800k)**
- **NRF Travel + KIC Funds: TRIUMF experiment + International Visitors (R120k)**
- **Global Challenge Research Funds/ Science & Technology Facilities Council in the UK (MANDELAb Phase 1, ~R2M)**
- **Global Challenge Research Funds/ Science & Technology Facilities Council in the UK (MANDELAb Phase 2, ~R10M)**
- **SA-CERN Collaboration: Trips to CERN, visitors, equipment (~R300k)**
- **Sponsors: XIA Digital Electronics (USA), MICRON Semiconductors (UK), Bio-Teknik, Netcare Hospitals.**
- **NITheCS grant (R500k).**

## STUDENT SUPERVISION

- **20 Graduated Students in the last 5 years (4 PhD, 14 MSc, 4 Postdocs):** T Dinoko (PhD, 2013), NA Khumalo (MSc 2014), N Erasmus (MSc 2014), CV Mehl (MSc, 2015), B. Singh (MSc, 2016), Kumar Raju (Postdoc, 2014-2016), MJ Mokholobotho (MSc, 2017), K Sowazi (MSc, 2018), T Nogwanya (MSc, 2018), S Masango (MSc, 2019), C Ngwetsheni (MSc, 2019), E Akakpo (MSc, 2019), N Kheswa (PhD, 2019), E Martin Montes (MSc 2019), LD Mavela (MSc, 2019), L Davis (MSc, 2019), GG O'Neill (Postdoc, 2016-2018), K Kapoor (2018-2019), N. Radebe (MSc, 2021), K Abrahams (PhD, 2021), C Mehl (PhD, 2021).
- **Current Students/Postdocs under my direct supervision (5 PhD, 4 MSc):**  
T Nogwanya (PhD), S Masango (PhD), C Ngwetsheni (PhD), B Lomberg (PhD), E Akakpo (PhD), N Radebe (MSc), AS Zulu (MSc), B Lesch (MSc), RA Madonsela (MSc), N Bernier (Postdoc), TD Bucher (Postdoc), K Abrahams (Postdoc).
- **Alumni:** MJ Mokholobotho (Machine Learning, Joburgh), K. Kapoor (TRIUMF postdoc), LD Mavela (High-school teacher in the Gramstowns), K. Raju (Postdoc in Japan and China), NA Khumalo (NMR), TS Dinoko (NMR), N Erasmus (IT), K Sowazi L Davis (NRG, Netherlands),
- **Student Exchange Programs at University of York, TRIUMF, CERN, Imperial College London, University of Kentucky.**

## Selected peer-reviewed PUBLICATIONS (>150 total)

- J. N. Orce & S. Ntshangase, Nature Physics (2021). IF: **20.03**
- J. E. Amaro, J Dudouet & J. N. Orce, Applied Mathematical Modelling **90**, 995 (2021); selected as Elsevier Public Health Emergency Collectiton. IF: **5.129**
- J. N. Orce, [International Journal of Modern Physics E Vol. 29, No. 03, 2030002 \(2020\)](#)  
Top 2020 Most Read Articles and selected as long-standing value for the last 30 years.
- C. Ngwetsheni and J. N. Orce, Physics Letters B **792**, 335 (2019). IF: **4.771**
- P. E. Garrett *et al.*, Physical Review Letters **123**, 142502 (2019). IF: **9.161**
- M. Kumar Raju, J. N. Orce *et al.*, Physics Letters B **777**, 250 (2018). IF: **4.771**
- Publications by my students, P. Butler, L.P. Gaffney, P. Spagnoletti, J. Konki, M. Scheck, J.F. Smith, [K. Abrahams et al.](#), Nature Communications (2019). IF: **14.92**; P. Butler *et al.*, Phys. Rev. Lett. **124**, 042503 (2020). IF: **9.161**
- More Publications @ Nico Orce Google Scholar Citations

## OUTREACH & MEDIA

- CERN Beam Time for Schools, Cedar House (Cape Town)
- THOPE Foundation and Zola School in Khayelitsha (Cape Town)
- Chair of the UWC Research Open Day (Plenary talks by Physics Nobel Laureate Serge Haroche)  
<https://www.youtube.com/watch?v=-ipl6CLiLnc>
- Schools in KwaZulu-Natal
- Senamile Masango Foundation for Women in Science (S Masango, UWC Ambassador)
- Supporting HDIs with state-of-the-art nuclear lab, conferences and international collaborations (CERN, TRIUMF).
- Building Role Models @ UWC: Lots of media coverage for our students (C Ngwetsheni, C Mehl, S Masango, K Abrahams, E Akakpo, K Kapoor, N Kheswa, etc)
- <https://home.cern/news/news/experiments/ubuntu-powerful-motto-important-experiment>
- <http://theconversation.com/africas-universities-can-shrug-off-history-and-stage-science-revolutions-65284>
- <https://www.pressreader.com/south-africa/cape-times/20191009/281689731563707>
- <https://www.pressreader.com/south-africa/zululand-observer/20191004/281857235276418>
- For much more information Google: Nico Orce + Students + CERN + TRIUMF + Nuclear + Tastes

## REFERENCES

- Prof Steven Yates (University of Kentucky USA): [yates@uky.edu](mailto:yates@uky.edu)
- Dr Gordon Ball (TRIUMF, Canada): [ball@triumf.ca](mailto:ball@triumf.ca)
- Prof David Jenkins (University of York, UK): [david.jenkins@york.ac.uk](mailto:david.jenkins@york.ac.uk)
- Prof Alison Bruce (University of Brighton, UK): [alison.bruce@bton.ac.uk](mailto:alison.bruce@bton.ac.uk)
- Prof Sifiso Ntshangase (University of Zululand): [sifiso.mgazi@gmail.com](mailto:sifiso.mgazi@gmail.com)
- Prof Krish Bharuth-Ram (University of KwaZulu-Natal): [kbr@sao.ac.za](mailto:kbr@sao.ac.za)
- Prof María José García Borge (CSIC/CERN): [maria.garcia.borge@cern.ch](mailto:maria.garcia.borge@cern.ch)
- Dr Karl Johnston (CERN): [karl.johnston@cern.ch](mailto:karl.johnston@cern.ch)