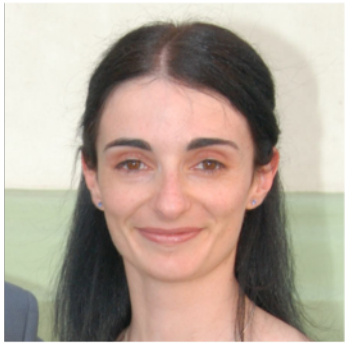
Prof. Emanuela Carleschi: Curriculum Vitae



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62 published/accepted articles in international peer-reviewed journals
10 published/accepted peer-reviewed articles in national conference proceedings

12 years of experience in coordinating and lecturing undergraduate and Honours physics courses at university level

South African National Research Foundation (NRF) Rating history:
C2, Established researcher (from 01/01/2020 to present)
Y2, Young researcher (from 01/01/2014 to 31/12/2019)

***h*-index: 14** (Google Scholar, 07 June 2022), **14** (Scopus, 07 June 2022)
***i10*-index: 24** (Google Scholar, 07 June 2022)
Number of citations: 632 (Google Scholar, 07 June 2022), **498** (Scopus, 07 June 2022)

Memberships: South African Institute of Physics (SAIP, since 2013)
Women in Physics in South Africa (WiPiSA, since 2013)
Organisation for Women in Science for the Developing World (OWSD, since 2014)

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Scopus Author ID: 14033986800
Web of Science ResearcherID: J-5801-2019
Google Scholar profile: https://scholar.google.com/citations?user=jzC6IX4AAAAJ&hl=en

1) Academic record

July 1997: Diploma di Maturità Classica, final mark awarded: 54/60, Liceo Scientifico Statale con annessa sezione di Liceo Classico "Francesco Gonzaga", Castiglione delle Stiviere (MN), Italy.

September 1998 - December 2004: Laurea Magistrale 110/110 *cum laude* in Physics, Università Cattolica del Sacro Cuore, Brescia (Italy).
Dissertation: *Study of the electronic structure of URu_2Si_2 by high-resolution angle resolved photoemission spectroscopy* (Advisor: Prof Fulvio Parmigiani)

January 2006 - March 2009: Doctoral Degree (PhD) in Physics, University of Trieste and Beamline BACH, Elettra Synchrotron Radiation Facility and TASC INFM-CNR National Laboratory, Trieste (Italy).
PhD Thesis: *Electronic structure of transition metal and rare earth ions in complex materials by resonant core-level spectroscopies* (Advisor: Prof Fulvio Parmigiani)

2) Employment history at the University of Johannesburg

July 2009 – September 2014: Lecturer (Contract), Department of Physics, APK campus.

October 2014 –July 2015: Lecturer (Permanent), Department of Physics, APK campus.

August 2015 – July 2019: Senior Lecturer (Permanent), Department of Physics, APK campus.

January 2016 – March 2017: Deputy Head of Department: Teaching and Learning, Department of Physics, APK campus.

April 2017 – March 2020: Head of Department, Department of Physics, APK campus.

August 2019 – present: Associate Professor (Permanent), Department of Physics, APK campus.

3) Awarded scholarships and fellowships

October 2003 - March 2004: INFM undergraduate fellowship, Beamline BACH, Elettra Synchrotron Radiation Facility and TASC INFM-CNR National Laboratory, Trieste (Italy).

April 2005 - December 2005: INFM graduate fellowship, Beamline BACH, Elettra Synchrotron Radiation Facility and TASC INFM-CNR National Laboratory, Trieste (Italy).

January 2006 – December 2008: PhD scholarship, Department of Physics, University of Trieste and Beamline BACH, Elettra Synchrotron Radiation Facility and TASC INFM-CNR National Laboratory, Trieste (Italy).

January 2009 - May 2009: Postdoctoral fellow, LILIT group, TASC INFM-CNR National Laboratory, Trieste (Italy). Topic: Fabrication and functionalization of microelectromechanical systems for biomolecular sensors (Project leader: Dr Marco Lazzarino).

4) Experimental physics background in condensed matter physics

- I am able to maintain and operate ultrahigh vacuum (UHV) chambers, including the preparation of samples under UHV conditions. I have experience in the operation of ^{4}He cryostats.

- I have experience in performing SQUID magnetometry and specific heat experiments in high magnetic fields and at low temperatures.

- I have substantial experience in the operation and use of synchrotron radiation beamlines for experiments in the soft and hard X-ray ranges (both as staff and user). I specialise in the following synchrotron-based experimental techniques: X-ray Photoemission Spectroscopy (also at high energy - HAXPES), Angle Resolved Photoemission Spectroscopy (ARPES) and X-ray Absorption Spectroscopy (NEXAFS and XAS).

- I also have experience in the following experimental techniques: X-ray Circular Magnetic Dichroism (XMCD), X-ray Linear Dichroism (XMLD), Low Energy Electron Diffraction (LEED), Resonant Inelastic X-ray Scattering (RIXS), X-ray Diffraction (XRD) and Scanning Electron Microscopy (SEM).

5) Presence at international research facilities

I have performed experiments at several beamlines in four European synchrotron radiation facilities. In particular: beamlines BACH, APE, XRD1 and XPRESS at Elettra (Trieste, Italy), beamlines ID12, ID16 and ID18 at the European Synchrotron Radiation Facility (Grenoble, France), beamline Cassiopee at Soleil (Paris, France), and beamline UE112-PGM-2b+I3-stat at BESSY II (Berlin, Germany).

<u>Visits to international synchrotron radiation facilities since 2009:</u>

18 - 26 May 2009
Beamline UE112-lowE-PGM-b 1^3 end station, Synchrotron BESSY II, Berlin (Germany)

Experiment: *Fermi surface and band structure investigations of superconducting Sr_2RuO_4 - Part 1* (Team member)

28 November - 04 December 2009
Beamline UE112-lowE-PGM-b 1^3 end station, Synchrotron BESSY II, Berlin (Germany)
Experiment: *Fermi surface and band structure investigations of superconducting Sr_2RuO_4 - Part 2* (Team member)

05 - 18 December 2009
Beamline APE, Synchrotron Elettra, Trieste (Italy)
Experiment: *Low-temperature band structure investigation of the trylayer ruthenate $Sr_4Ru_3O_{10}$* (Project leader)

13 - 26 February 2010
Beamline UE112-lowE-PGM-b 1^3 end station, Synchrotron BESSY II, Berlin (Germany)
Experiment: *Symmetry of van Hove singularities, metamagnetism and quantum criticality in $Sr_3Ru_2O_7$: an angle resolved photoemission study* (Project leader)

12 - 18 May 2010
Beamline ID12, European Synchrotron Radiation Facility (ESRF), Grenoble (France)
Experiment: *X-ray magnetic circular and linear dichroism on the magnetic phases of $Sr_4Ru_3O_{10}$* (Team member)

22 - 29 November 2010
Beamline Cassiopee, Synchrotron Soleil, Paris (France)
Experiment: *Fermi surface investigation of the trylayer ruthenate $Sr_4Ru_3O_{10}$* (Project leader)

16 - 22 April 2012
Beamline XRD1, Synchrotron Elettra, Trieste (Italy)
Experiment: *Pressure response of charge ordered Fe_2OBO_3 investigated via synchrotron-based x-ray diffraction* (Team member)

07 - 13 October 2013
Beamline BACH, Synchrotron Elettra, Trieste (Italy)
Experiment: *Electronic structure investigation of the intermetallic ferromagnet $CePdIn_2$ by means of resonant electron spectroscopies* (Project leader)

16 - 22 December 2014
Beamline BACH, Synchrotron Elettra, Trieste (Italy)
Experiment: *Tuning of the hybridization strength and Ce 4f localisation in $Ce_{1-x}La_xCu_4Al$: from Kondo lattice to single-ion Kondo behavior - A spectroscopic investigation* (Project leader)

27 January - 02 February 2015
Beamline ID18, European Synchrotron Radiation Facility (ESRF), Grenoble (France)
Experiment: *Low-pressure high-temperature Mossbauer measurements of charge ordered $LuFe_2O_4$* (Team member)

11 - 15 November 2015
Beamline ID18, European Synchrotron Radiation Facility (ESRF), Grenoble (France)
Experiment: *Low-pressure high-temperature Mossbauer measurements of the narrow-gap semiconductor $FeGa_3$* (Team member)

15 - 19 March 2016
Beamline XPRESS, Synchrotron Elettra, Trieste (Italy)
Experiment: *Pressure response of the crystal structure of CeCuSi and $FeGa_3$ investigated via synchrotron-based x-ray diffraction* (Team member)

24 - 29 May 2016
Beamline BACH, Synchrotron Elettra, Trieste (Italy)

Experiment: $Ce_{1-x}La_xCu_4Al$: *investigation of Ce 4f wave function evolution from a coherent to a local Kondo effect* (Project leader)

28 September – 03 October 2017
Beamline ID24, European Synchrotron Radiation Facility (ESRF), Grenoble (France)
Experiment: *Pressure response of the local atomic coordination in the narrow band gap semiconductor $FeGa_3$ and its relation to the semiconductor to metal transition* (Team member)

6) Postgraduate student supervision experience

Graduated students

Doctoral students

- Co-supervisor of the PhD project of Mr. Wisdom Nkosilathi Sibanda, Department of Physics, University of Johannesburg, South Africa. Title of the project: "*Pressure tuning the magneto-electronic behaviour of Fe-based charge ordered and multiferroic compounds*". PhD awarded in September 2016.

Masters students

- Supervisor of the MSc project of Ms. Chani Stella van Niekerk, Department of Physics, University of Johannesburg, South Africa. Title of the project: "*Influence of sample purity on the electronic structure of $TiSe_2$*". MSc awarded in May 2019 (final mark 71%). Winner of the award for the best MSc poster presentation in Condensed Matter Physics at the SAIP2017 National Conference (July 2017).
- Supervisor of the MPhil project of Mr. Tshepo Mahafa, Department of Physics, University of Johannesburg, South Africa. Title of the project: "*Fast neutron and deuterium ion irradiation-induced damage on graphite and zircaloy-4 used as structural materials in nuclear reactors*". MPhil awarded ***with Distinction*** (final mark 79%) in June 2016. Winner of the award for the best Masters poster presentation in Condensed Matter Physics at the SAIP2015 National Conference (July 2015).
- Co-supervisor of the MSc project of Mr. Mustafa Ahmed, Department of Physics, University of Johannesburg, South Africa. Title of the project: "*Magnetism and pressure-induced metal-insulator transition in $FeGa_3$*". MSc awarded ***with Distinction*** (final mark 76%) in April 2016. Currently enrolled for a PhD in Physics at the University of Pretoria in South Africa, under the supervision of Prof. Walter Meyer and Dr. Jackie Nel.
- Supervisor of the MSc project of Ms Arlette Sohanfo Ngankeu, Department of Physics, University of Johannesburg, South Africa. Title of the project: "*Fermi-surface-driven metamagnetism in the layered strontium ruthenate $Sr_3Ru_2O_7$*". MSc degree awarded ***with Distinction*** (final mark 85%) in June 2014. Recently graduated with a PhD in Physics at Aarhus University in Denmark, under the supervision of Prof. Philip Hofmann.
- Co-supervisor of the MSc project of Mr Prosper Ngabonziza, Department of Physics, University of Johannesburg, South Africa. Title of the project: "*Angle resolved photoemission spectroscopy study of the three-layered strontium ruthenate $Sr_4Ru_3O_{10}$*". MSc degree awarded ***with Distinction*** (final mark 92%) in July 2012. *Winner of the S2A3 bronze medal*. Winner of the award for the best MSc oral presentation in Condensed Matter Physics at the SAIP2012 National Conference (July 2012). Currently employed as a postdoctoral fellow at the Max Plank Institute in Stuttgart.

Honours students

- Supervisor of the Honours project of Ms. Francina Phuti, Department of Physics, University of Johannesburg, South Africa. Title of the project: "XPS analysis of Bi-Te-O photocatalysts". Project completed in January 2021.
  Supervisor of the Honours project of Ms. Nomsa Moloi, Department of Physics, University of Johannesburg, South Africa. Title of the project: "XPS analysis of Pt-Te-O photocatalysts". Project completed in January 2021.
- Supervisor of the Honours project of Mr. Jason Hoenselaar, Department of Physics, University of Johannesburg, South Africa. Title of the project: "*Electronic structure investigation of $EuNiO_3$ and $SmNiO_3$*". Project completed ***with Distinction*** in December 2017.
- Supervisor of the Honours project of Ms. Chani Stella van Niekerk, Department of Physics, University of Johannesburg, South Africa. Title of the project: "*Precise visualization of dispersive low-energy features in ARPES spectra*". Project completed ***with Distinction*** in December 2016. Winner of the

award for the best Honours poster presentation in Condensed Matter Physics at the SAIP2016 National Conference (July 2016).

- Final essay supervisor of the Postgraduate Diploma in Mathematical Sciences for Ms Arlette Sohanfo Ngankeu, African Institute for Mathematical Sciences, Muizelberg, Cape Town, South Africa. Title of the essay: "*Angle Resolved Photoemission Spectroscopy: a powerful tool to probe the low-energy electronic structure of correlated systems*". Essay defense: 2nd June 2011.
- Co-supervisor of triennial laurea dissertation "*Resonant photoemission measurements on $[Bi_2Ba_2O_4][CoO_2]_2$ cobaltate, single crystals*", Mr Alessandro Tuniz, Department of Physics, University of Trieste, Academic Year 2005-2006.

In progress students

- Supervisor of the MSc project of Mr Jason Hoenselaar, Department of Physics, University of Johannesburg, South Africa. Title of the project: "*Epitaxial growth and characterisation of two dimensional plumbene monolayers*".
- Co-supervisor of the PhD project of Mr Thabo Matthews, Department of Chemical Sciences, University of Johannesburg, South Africa. Title of the project: "*Adding value to South African resources: Atomically Dispersed Metal Electrocatalysts on Nano-Supports Materials for an Efficient Energy Conversion*".

Postgraduate students' awards:

- July 2017: Chani van Niekerk (MSc student, supervised) was awarded the prize for best MSc poster presentation at the SAIP2017 national conference.
- July 2016: Chani van Niekerk (Honours student, supervised) was awarded the prize for best Honours poster presentation at the SAIP2016 national conference.
- July 2015: Tshepo Mahafa (MPhil student, supervised) was awarded the prize for best MSc poster presentation at the SAIP2015 national conference.
- May 2013: Prosper Ngabonziza (MSc student, co-supervised) was awarded the prestigious S2A3 Bronze medal for his MSc dissertation at the University of Johannesburg.
- July 2012: Prosper Ngabonziza (MSc student, co-supervised) was awarded the prize for best MSc oral presentation at the SAIP2012 national conference.

7) Attendance at schools

- ICTP School on Synchrotron Radiation and Applications 2004 - In memory of J.C. Fuggle and L. Fonda, Abdus Salam International Center of Theoretical Physics, Grignano, Trieste (Italy), 19 April - 21 May 2004.

- 1st International Summer school of MAINZ - MATCOR - Photoemission, Johannes Gutenberg University, Mainz (Germany), 25 - 30 September 2006.

- School and Workshop on Highly Frustrated Magnets and Strongly Correlated Systems: From Non-Perturbative Approaches to Experiments, Abdus Salam International Center of Theoretical Physics, Miramare – Trieste (Italy), 30 July - 17 August 2007.

8) Conferences, workshops and seminar presentations

- Workshop on Novel States and Phase Transitions in Highly Correlated Matter, Abdus Salam International Centre of Theoretical Physics, Grignano - Trieste (Italy), 12 - 23 July 2004.

- Poster presentation: *Growth of manganese silicide films by co-deposition of Mn and Si on Si(111): a spectroscopic and morphological investigation.* ECOSS 23 European Conference on Surface Science, Berlin (Germany) 4 - 9 September 2005.

- Fourth Stig Lundqvist Conference on Advancing Frontiers of Condensed Matter Physics, Abdus Salam International Center of Theoretical Physics, Miramare - Trieste, Italy, 3 - 7 July 2006.

- Oral presentation (contributed speaker): *Manganese silicide single crystal and films deposited on Si(111): a comparative spectroscopic study*. ECOSS 24 European Conference on Surface Science, Paris (France), 4 - 8 September 2006.

- First international workshop on the physical properties of lamellar cobaltates, Universitè Paris - Sud 11, Orsay, Paris (France) 16 - 20 July 2006.

- Orbital 2007 - 6th Workshop on Orbital Physics and Novel Phenomena in Transition Metal Oxides, Max-Planck-Institut für Festkörperforschung, Stuttgart (Germany), 10 - 11 October 2007.

- Oral presentation (invited speaker): *ARPES on $Sr_4Ru_3O_{10}$: state of the art and way forward*. Meeting of MAMA European Grant Collaboration, Department of Physics, University of Salerno, Salerno (Italy), 03 - 05 October 2012.

- Oral presentation (invited speaker): *Wave motion and wave mechanics*. Training course for high-school teachers, University of Johannesburg, Faculty of Education, 11 May 2013.

- Oral presentation (contributed speaker): *If 1 + 1 = 3 then E = 1/2 mc!*. 58th SAIP2013 Annual conference of the South African Institute of Physics, University of Zululand, Richards Bay (South Africa), 8-12 July 2013.

- Poster presentation: *$CePdIn_2$: a concentrated Kondo ferromagnet.* 59th SAIP2014 Annual conference of the South African Institute of Physics, University of Johannesburg, Johannesburg (South Africa), 7-11 July 2014.

- Oral presentation (speaker and organizer of the workshop): *Synchrotron radiation: Basic principles and instrumentation*. Mini-workshop on Synchrotron Radiation Based Spectroscopies and Applications, Auditorium Library APK Campus, University of Johannesburg, 26 February 2015.

- Poster presentation: *Electronic band structure and Fermi surface of $Sr_4Ru_3O_{10}$*. CORPES15 - International Conference on Strong Correlations and Angle-Resolved Photoemission Spectroscopy, Couvent des Cordeliers, Paris (France), 05 - 10 July 2015.

- Oral presentation (invited speaker): *Electronic structure studies at UJ: current and future research*. Workshop on physical properties and their measurements, Department of Physics, University of Johannesburg, 26 - 28 October 2015.

- Oral presentation (contributed speaker): *Understanding of vector addition and subtraction by first year university students: graphical versus algebraic methods*. 61st SAIP2016 Annual conference of the South African Institute of Physics, University of Cape Town, Cape Town (South Africa), 4-8 July 2016.

- Poster presentation: *$Ce_{1-x}La_xCu_4Al$ as a case study for the investigation of Ce 4f wave function evolution from a coherent to a local Kondo effect.* 61st SAIP2016 Annual conference of the South African Institute of Physics, University of Cape Town, Cape Town (South Africa), 4-8 July 2016.

- Oral presentations (speaker and organiser of the workshop): *Introduction to the theory of XPS*; *Sample charging effects in XPS*; *XPS fitting: programmes*. XPS workshop @ UJ, APK Library, University of Johannesburg, Johannesburg (South Africa), 30-31 January 2018.

- Panel discussant at the Italy-SA Roundtable Discussion on Women and Research: experience of, and contributions to, the knowledge enterprise, organised by NRF, DST, ASSAf and the Italian Embassy in Pretoria, and hosted at the NRF Headquarters in Pretoria on 18 April 2018.

- Oral presentation (contributed speaker): *General Physics for Earth Sciences, an undergraduate introductory physics course for first-year students majoring in the earth Sciences at the University of Johannesburg*. International Conference on Physics Education (ICPE), Misty Hills Hotel and Conference Centre, Muldersdrift, Johannesburg (South Africa), 01-05 October 2018.

- Oral presentation (invited speaker): *How to publish*. Women In Science training workshop (co-

organised by ICTP-EAIFR, OWSD and University of Rwanda), University of Rwanda, Kigali (Rwanda), 16-19 October 2018.

- Oral presentation (invited speaker): *Overview of photoemission spectroscopy as a tool for electronic structure investigations of materials* (served as non-specialist annual lecture of the Division for Condensed Matter and Materials of the South African Institute of Physics), 64th SAIP2019 Annual conference of the South African Institute of Physics, University of Venda, Protea Ranch Hotel in Polokwane (South Africa), 09-12 July 2019.

- Oral presentation (contributed speaker): *Ideas around using Google Earth as a pedagogic tool for teaching wave concepts in the era of Industry 4.0*, 64th SAIP2019 Annual conference of the South African Institute of Physics, University of Venda, Protea Ranch Hotel in Polokwane (South Africa), 09-12 July 2019.

9) Lecturing experience (at the University of Johannesburg)

My teaching responsibilities since the second semester of 2009 (when I first joined UJ) are summarized in the table below.

Semester	Course	Role	Format of lectures (or practicals)
2nd 2021	PHY8X15	Lecturer	one 3 hour lecture each week
2nd 2021	PHY002Y/ PHY00Y2	Lecturer	one double lecture each week (only for half of the semester)
1st 2021	PHYE0A2/ PHYE2A2	Lecturer	two double lectures each week (for 80% of the semester)
2nd 2020	PHY8X15	Lecturer	one 3 hour lecture each week
2nd 2020	PHY002Y/ PHY00Y2	Lecturer	one double lecture each week
2nd 2019	PHY8X15	Lecturer	one 3 hour lecture each week
2nd 2019	PHYS0B1	Practical Coordinator	two 3 hour sessions each week
1st 2019	PHY002Y/ PHY00Y2	Lecturer	one double lecture each week
2nd 2018	PHYS0B1	Practical Coordinator	two 3 hour sessions each week
2nd 2018	PHY8X15	Lecturer	one 3 hour lecture each week
1st 2018	PHY002Y/ PHY00Y2	Lecturer	one double lecture each week
2nd 2017	PHY8X15	Lecturer	one 3 hour lecture each week
1st 2017	PHY003A	Lecturer	three double lectures each week
1st 2017	PHY002Y	Lecturer	one double lecture each week
2nd 2016	PHY0087	Lecturer	one 3 hour lecture each week
2nd 2016	PHY002Y	Lecturer	one double lecture each week
1st 2016	PHYG01A	Lecturer	three double lectures each week
2nd 2015	PHY002Y	Lecturer	one double lecture each week
1st 2015	PHYG01A	Lecturer	three double lectures each week
2nd 2014	PHY002Y	Lecturer	one double lecture each week

1st 2014	PHYG01A	Lecturer	three double lectures each week
2nd 2013	PHY1A2E	Practical Coordinator	two 3 hour sessions each week
1st 2013	PHY1C01	Lecturer	two single lectures + one double lecture per week
2nd 2012	PHY0087	Lecturer	one 3 hour lecture each week
1st 2012	PHY1C01	Lecturer	two single lectures + one double lecture per week
2nd 2011	PHY0087	Lecturer	one 3 hour lecture each week
1st 2011	PHY1C01	Lecturer	two double lectures each week
2nd 2010	PHY1D01	Lecturer	two double lectures each week
1st 2010	PHY1Aext	Assistant for Practicals	two 3 hour sessions each week
1st 2010	PHY1C01	Lecturer	two double lectures each week
2nd 2009	PHY1D01	Lecturer	two double lectures each week

PHY8X15/PHY0087 - Advanced Solid State B (BSc Physics Honours). Topics of the course: Fermi surfaces and electronic structure, Superconductivity, Magnetic resonance, Point defects, Dislocations, Nonocrystalline solids and Alloys.

PHY002Y/PHY00Y2 - Waves and Optics (2nd year course for science major students). Topics of the course: general wave concepts, the linear wave equation, sinusoidal waveforms, complex harmonic waveforms and their relevance in wave mechanics, Huygens' and Fermat's principles, wave interference.

PHYE0A2/PHYE2A2 – Engineering Physics 2A (2nd year course for Engineering students). Topics of the course: vector calculus, electrostatics, electric currents, magnetostatics, time-varying electromagnetic fields, plane wave propagation.

PHY003A Quantum Mechanics and Modern Physics (3rd year course for science major students). Topics of the course: wave function, time-independent Schrödinger equation, Dirac formalism, angular momentum and spin, quantum mechanics in three-dimensions, hydrogen atom, identical particles, and selected topics in nuclear and particle physics.

PHYG0A1 *General Physics for Earth Sciences* (1st year service course for science students in the earth sciences). Topics of the course: units, vectors, motion in one and two dimensions, Newton's laws, friction, linear momentum, energy, stress and strain, deformation of solids, rheology, gravity and isostasy.

PHY1C01 (1st year service for optometry and physics non major students). Topics of the course: Mechanics, thermodynamics, material properties and oscillations.

PHY1D01 (1st year service for optometry and physics non major students). Topics of the course: Electricity, magnetism, wave motion, optics and modern physics.

Teaching workshops and seminars attended for professional development

- 7th - 8th October 2009: Academic Preparation Programme (Academic Preparation of New Academic Staff), Centre for Professional Academic Staff Development, University of Johannesburg.
- 26th October 2010: First Year Academy Meeting, Faculty of Science, University of Johannesburg. (I gave a presentation on "How does TUTORING assist learning?")
- 28th January 2011: First Year Academy Meeting on "How do we teach problem solving and critical thinking", Faculty of Science, University of Johannesburg.

- 25th August 2011: "The role of the academic leadership", Seminar by Prof David Siegel from the East Carolina University, USA.
- Attendance at the Postgraduate Supervision Forum (speaker: Dr Moyra Keane) on 19 September 2011, organized by the Centre for Professional Academic Staff Development and Postgraduate Centre of the University of Johannesburg.
- Attendance at the Teaching Portfolio Workshop on 20 March 2014, organized by the Centre for Professional Academic Staff Development of the University of Johannesburg.
- Attendance at "Masterclass: Using technology for teaching and learning" (speaker: Prof. John Sandars, University of Sheffield, UK), University of Johannesburg 02 March 2015.
- Attendance at "Teaching and Learning Symposium - Exploring Industry 4.0" (morning sessions only), Johannesburg Country Club 10 May 2019.

Experience in curriculum development

1) 2nd semester 2011: Upgrade of the Honours course PHY0087 Advanced Solid State Physics B. Modification of the syllabus with the introduction of topics such as band theory, tight-binding model, density of states, BCS theory of superconductivity, as well as the analysis of relevant research articles from the recent literature to be done in class as part of the curriculum.

2) 1st semester 2014: Design of the syllabus of the new 1st year course PHYG01A General Physics for Earth Sciences for UJ students majoring in Geology, Geography and Environmental Management. The course has been specifically designed in collaboration with the Departments of Geology and Geography in order to provide Earth Sciences students with the understanding of fundamental physics concepts that are relevant in their fields of study.
Topics of the course: units and vectors; motion in one and two dimensions; forces, Newton's laws, linear momentum and friction in geology; energy and its conservation; solids and fluids concepts in geophysics (including elasticity theory, stress and strain, density and pressure, buoyancy, rheology, lithospheric flexure, viscosity of the mantle); gravity and isostasy. Development of ad-hoc handouts for some of the above-mentioned topics. These handouts constitute integral part of the study material for the course.

3) 2nd semester 2014: Design of the syllabus of the second half of the new annual 2nd year course PHY002Y Waves and Optics for UJ students majoring in Physics.
Topics of the course: general wave concepts, the linear wave equation, sinusoidal waveforms, complex harmonic waveforms and their relevance in wave mechanics, Huygens' and Fermat's principles, wave interference.

4) 2nd semester 2021: Design and development an innovative online learning activity on sound waves to enhance the understanding of wave concepts and computer literacy for second year physics students in PHY002Y/PHY00Y2 by using free access/licence free software and the harmonics produced by a cello.

External moderation

2010: External examiner for the MSc Thesis of Mr Ibrahim Bala Usman. Title of dissertation: "Synthesis and characterization of Sm-based orthoferrite compounds $SmFe_{1-x}Mn_xO_3$". Supervisor: Prof. Giovanni Hearne, School of Physics, University of the Witwatersrand.

2011 – 2014: External moderator for the first semester module CHE3030 (Applied Chemistry – Surface and Bulk Characterization Techniques, at 3rd year level), School of Chemistry, University of the Witwatersrand. Duties: moderation of the exam question paper, as well as the re-marking of 20% of the exam scripts.

2014: External moderator for the course notes for the module Physics II E (2nd year level, for electrical engineering students), School of Physics, University of the Witwatersrand.

2020 – 2022: External moderator for the second semester module PHYS314 (Statistical Physics, at 3rd year level), School of Physics and Chemistry, University of the KwaZulu Natal, Westville Campus. Duties: moderation of the semester test question papers, as well as the re-marking of the borderline test scripts.

2022 – 2025: External examiner for all 2nd year, 3rd year and Honours physics courses offered by the Department of Physics and Electronics of the Rhodes University, Grahamstown, South Africa.

10) Leadership, administration and enhancement of the discipline

a) Leadership roles within UJ

- June – November 2021: Member of the task team in charge of the 2021 Faculty of Science fundraising campaign Science x Art 2021, with the portfolio of creative lead in dance and filming.
- April 2017 – March 2020: Appointed as Head of Department, Physics (APK campus). These are some of the departmental highlights during my tenure as HoD:
  - ✓ 2020 QS World University Rankings by Subject: Physics & Astronomy ranked in the 451-500 bracket globally and joint fourth nationally.
  - ✓ 2019 QS World University Rankings by Subject: Physics & Astronomy ranked in the 451-500 bracket globally and fourth nationally. This marked the first time that UJ was ranked for this subject.
  - ✓ 2019 U.S. News & World Report's Best Global Universities Rankings (BGUR) by subject: UJ Physics ranked number 319 worldwide, and 3rd in South Africa and 5th in Africa (was number 320 in 2018).
  - ✓ 2018 Global Ranking of Academic Subjects by Shanghai Ranking Consultancy (ARWU): UJ ranked in the 301-400 band globally (out of 500 ranked institutions) in Physics; UJ was one of four South African universities ranked and in joint second position in the country.
  - ✓ 2017 Global Ranking of Academic Subjects by Shanghai Ranking Consultancy (ARWU): UJ ranked in the 301-400 band globally (out of 500 ranked institutions in Physics); UJ was one of four South African universities ranked and in joint second position in the country.
  - ✓ Physics APK recipient of the 2018 Faculty of Science Departmental Award.
  - ✓ Establishment of the first Research Centre hosted in the Department (Centre for Astro-Particle Physics, or CAPP, lead by Prof Soebur Razzaque).
  - ✓ Doubling the number of visiting staff associated with the Department.
  - ✓ Facilitating staff transformation in the Department by means of the appointment of three designated candidates (one female and two male) as Assistant Lecturers.
  - ✓ Establishment of the Undergraduate Physics Club.
  - ✓ Largest Physics Honours cohort ever enrolled (11 students in 2018).
  - ✓ Largest Physics 3 cohort ever enrolled (25 students in 2019) and Honours in 2018.
- January 2016 – March 2017: Appointed as Deputy Head of Department: Teaching and Learning, Physics (APK campus).
- July 2018 – June 2019: Member of the 2018 cohort of the UJ Women's Leadership Development Programme (UJWLDP).
- January 2022 – present: Member of the Faculty of Science Research Committee (FRC).
- May 2016 – November 2018: Member of the Faculty of Science Teaching and Learning Committee (FTLC).
- January – May 2016: Member of the task team that compiled the Faculty of Science annual report for 2015.
- July 2015 – March 2016: Member of the task team in charge of the compilation of the relevant documentation for the departmental review that took place in March 2016. Portfolio: Review of the undergraduate courses for Physics majors.
- January – May 2015: Member of the task team that compiled the Faculty of Science annual report for 2014.
- 2012 – 2016: Coordinator and organiser of the activities of the Undergraduate Physics Club, intended to stimulate the interest of undergraduate students in choosing a career path in Physics and majoring in Physics subjects. The activities organised throughout the years include the following: the UDG Colloquium series in 2013 and 2014; organization of the annual trip to the Hartebeesthoek Radio Astronomy Observatory (HartRAO); organization of the annual physics students' braai; assistance in undergraduate bursaries applications; mentoring of undergraduate physics students.
- 2012 – 2015: Organiser of the annual Physics Awards Ceremony, a social function meant to honor the top achievers in all undergraduate and Honours modules in Physics. Duties: catering, printing of certificates, search for sponsorship for book prizes, assessment of final module marks of the previous year to identify top achievers.

- January 2011 – December 2012: Webmaster of the UJ Department of Physics website (http://www.uj.ac.za/physics), responsible for the update and editing of the content uploaded on the website.
- October 2010 – October 2011: Physics Department representative in the First Year Orientation Committee of the Faculty of Science.

b) Leadership roles within the South African Institute of Physics (SAIP) and Women in Physics in South Africa (WiPiSA) Chapter

- July 2021 – July 2023: Elected member of the Executive Council of the SAIP. Portfolios: Awards and Standards, and WiPiSA liaison.
- July 2016 – present: Elected member of the Executive Committee (EXCO) of the Division for Condensed Matter and Materials of the SAIP. Elected as Women in Physics representative on the EXCO as from December 2018.
- April 2013 – July 2014: Member of the Local Organising Committee of the SAIP2014 Annual Conference hosted by the Physics Department at UJ from the 7th to the 11st of July 2014. Conference Portfolio: *Catering, Social Events and Transport Coordination*. Conference website: http://events.saip.org.za/conferenceDisplay.py?ovw=True&confId=34.
- July 2013 – November 2016: WiPiSA representative for the UJ Department of Physics, including the organization of the WiPiSA annual lunch to promote networking and mentoring of female undergraduate and postgraduate students in Physics.
- September 2014 – July 2016: Member for the National Working Group of WiPiSA. Portfolio: website and communication with the broader community.

c) Other

- Reviewer for Scientific Reports (impact factor: 4.122), Physical Review B (impact factor: 3.836), Physical Review Materials (impact factor: 4.86), Journal of Physics: Condensed Matter (impact factor: 2.617), Rare Metals (impact factor: 1.50); Physical Review Letters (impact factor: 8.839), Applied Surface Science (impact factor: 4.439).
- Reviewer for SAIP2014, SAIP2015, SAIP2016, SAIP2017 and SAIP2021 conference proceedings, as well as reviewer for the International Conference on Physics Education 2018 proceedings.
- Reviewer and panelist member for National Research Foundation (NRF) funding calls. In particular, NRF SARChi Chair in 2015 (reviewer), NRF Rating in 2016 (reviewer), and NRF-NEP in 2016 (panel member), NRF-CPRR/CSUR/RDGYR in 2019 (panel member), NRF-CPRR in 2021 (reviewer).
- April 2017: Panelist member for the departmental review of the BSc M-Stream: Majors Chemistry, Applied Chemistry, Chemical technology and Physics in the School of Chemistry and Physics at the University of Kwa-Zulu Natal.
- 30 – 31 January 2018: Co-organiser and speaker of the XPS@UJ 2018 workshop (91 participants).
- 26 February 2015: Organiser and speaker of the Mini workshop on Synchrotron Radiation Based Spectroscopies and Applications at UJ (24 participants).

11) Articles written for The Conversation Africa (https://theconversation.com/africa):

1. Academics must still 'publish or perish' under revamped research funding policy, published on 23 October 2015 (The Conversation – Education).
This article was republished in the University World News and AllAfrica on 23 October 2015.
This article has ~1200 readers to date.

2. Why Italy's income-based scheme for university fees makes sense, published on 25 October 2015 (headline article for two days) (The Conversation – Education).
This article was republished in: SABC News, News24, AllAfrica, Egypt News, EyeWitness News and Netwerk24 (translated in Afrikaans).
This article has ~9600 readers to date.
I was interviewed about the content of this article by Kieno Kammies on 567 Cape Talk Radio Station on Wednesday 28 October 2015 at 07:20 during the *Breakfast with Kieno Kammies* programme.

3. Why lecturers need to know all about their students' lives, fears and hopes, published on 02 March 2016 (The Conversation – Education). This article was republished on the Daily News (hard copy, 04 March 2016 edition, page 8), UJ News and Events website, eNCA, EyeWitness News, Times Live, MSN

and Daily Higher Education News.
This article has ~9100 readers to date.
I was interviewed about the content of this article by John Robbie on 702 Radio Talk on Friday 04 March 2016 at 06:40 during *The John Robbie Show*, as well as on UNISA Radio on Wednesday 09 March 2016 at 12:30. I was also interviewed by Destiny Man.

4. Women in science: equality is impossible unless society shifts, published on 08 March 2016 in occasion of International Women's Day (The Conversation – Science & Technology).
This article has been republished in The Huffington Post, Mail & Guardian Africa, AllAfrica and All4Women. It was also republished on the African Independent (hard copy, 24 March 2016 edition, page 9) with the title: "Women in science need societal shift".
This article has ~7500 readers to date.

List of publications of Emanuela Carleschi

Articles published/accepted in international peer-reviewed journals

(Please note: Impact factors are given for the year of publication of the research articles)

1. F. Bondino, E. Magnano, **E. Carleschi**, M. Zangrando, F. Galli, J.A. Mydosh, F. Parmigiani
Electronic structure of the charge-density-wave compound $Er_5Ir_4Si_{10}$
Journal of Physics: Condensed Matter 18, 5773-5782 (2006) (*impact factor: 2.617*)

2. E. Magnano, **E. Carleschi**, A. Nicolaou, T. Pardini, M. Zangrando, F. Parmigiani
Growth of manganese silicide films by co-deposition of Mn and Si on Si(111): a spectroscopic and morphological investigation
Surface Science 600, 3932-3937 (2006) (*impact factor: 4.439*)

3. M. Zangrando, E. Magnano, A. Nicolaou, **E. Carleschi**, F. Parmigiani
Observation of the two-hole satellite in Mn metal films by radiationless resonance Raman spectroscopy at the 2p edge
Physical Review B 75, 233402 (2007) (*impact factor: 3.836*)

4. B.P. Doyle, **E. Carleschi**, E. Magnano, M. Malvestuto, A.A. Dee, A.S. Wills, Y. Janssen, P.C. Canfield
Temperature-independent ytterbium valence in YbGaGe
Physical Review B 75, 235109 (2007) (*impact factor: 3.836*)

5. **E. Carleschi**, E. Magnano, M. Zangrando, F. Bondino, A. Nicolaou, F. Carbone, D. Van der Marel, F. Parmigiani
Manganese silicide single crystal and films deposited on Si(111): a comparative spectroscopic study
Surface Science 601, 4066-4073 (2007) (*impact factor: 4.439*)

6. K.B. Garg, N.L. Saini, B.R. Sekhar, R.K. Singhal, B. Doyle, S. Nannarone, F. Bondino, E. Magnano, **E. Carleschi**, T. Chatterji
Doped holes and Mn valence in manganites: a polarized soft x-ray absorption study of $LaMnO_3$ and quasi-2D manganite systems
Journal of Physics: Condensed Matter 20, 055215 (2008) (*impact factor: 2.617*)

7. F. Bondino, K.B. Garg, E. Magnano, **E. Carleschi**, M. Heinonen, R.K. Shinghal, S.K. Gaur, F. Parmigiani
Electronic structure of Mn-doped ZnO by x-ray emission and absorption spectroscopy
Journal of Physics: Condensed Matter 20, 275205 (2008) (*impact factor: 2.617*)

8. K.B. Garg, P. Nordblad, M. Heinonen, N. Panwar, S.K. Agarwal, F. Bondino, E. Magnano, **E. Carleschi**, F. Parmigiani
Study of Sb substitution for Pr in the $Pr_{0.67}Ba_{0.33}MnO_3$ system
Journal of Magnetism and Magnetic Materials 321, 305-311 (2009) (*impact factor: 3.046*)

9. **E. Carleschi**, M. Malvestuto, M. Zacchigna, A. Nicolaou, V. Brouet, S. Hébert, H. Muguerra, D. Grebille, F. Parmigiani
Electronic structure and charge transfer processes in Bi-Ca misfit cobaltate
Physical Review B 80, 035114 (2009) (*impact factor: 3.836*)

10. M. Malvestuto, **E. Carleschi**, R. Fittipaldi, E. Goralev, E. Pavarini, M. Cuoco, Y. Maeno, F. Parmigiani, A. Vecchione
Electronic structure trends in $Sr_{n+1}Ru_nO_{3n+1}$ family (n=1,2,3)
Physical Review B 83, 165121 (2011) (*impact factor: 3.836*)

11. **E. Carleschi**, E. Magnano, M. Melli, M. Lazzarino
Cycloaddition functionalization of cleaved microstructures
ChemPhysChem 13, 459-462 (2012) (*impact factor: 3.075*)

12. V.B. Zabolotnyy, **E. Carleschi**, T. Kim, A.A. Kordyuk, J. Trinckauf, J. Geck, D. Evtushinsky, B.P.

Doyle, R.T. Fittipaldi, M. Cuoco, A. Vecchione, B. Büchner, and S.V. Borisenko
Surface and bulk electronic structure of unconventional superconductor Sr_2RuO_4: unusual splitting of the β band
New Journal of Physics 14, 063039 (2012) (*impact factor: 3.579*)

13. S.V. Borisenko, V.B. Zabolotnyy, A.A. Kordyuk, D. Evtushinsky, T. Kim, **E. Carleschi**, B.P. Doyle, R. Fittipaldi, M. Cuoco, A. Vecchione and H. Berger
Fermi surface mapping of Sr_2RuO_4 at low temperatures
Journal of Visualized Experiments (JOVE) 68, e50129 (2012) (*impact factor: 1.325*)

14. G.R. Hearne, W.N. Sibanda, **E. Carleschi**, V. Pischedda and J.P. Attfield
Pressure-induced suppression of charge order and nanosecond valence dynamics in Fe_2OBO_3
Physical Review B 86, 195134 (2012) (*impact factor: 3.836*)

15. J.L. Snyman, **E. Carleschi**, B.P. Doyle and A.M. Strydom
Anomalous and conventional magnetocaloric effects in CeSi
Journal of Applied Physics 113, 17A903 (2013) (*impact factor: 2.176*)

16. D.T. Dekadjevi, A. Prinsloo, **E. Carleschi**, S.P. Pogossian, J. Phi. Jay, D. Spenato, J. Ben Youssef and A. Strydom
Driving the magnetization reversal below the blocking temperature in exchange biased NiFe/NiO
Journal of Applied Physics 114, 093904 (2013) (*impact factor: 2.176*)

17. V.B. Zabolotnyy, D.V. Evtushinsky, A.A. Kordyuk, T.K. Kim, **E. Carleschi**, B.P. Doyle, R. Fittipaldi, M. Cuoco, A. Vecchione and S.V. Borisenko
Renormalized band structure of Sr_2RuO_4: a quasiparticle tight-binding approach
Journal of Electron Spectroscopy and Related Phenomena 191, 48-53 (2013) (*impact factor: 1.601*)

18. M. Malvestuto, V. Capogrosso, **E. Carleschi**, L. Galli, E. Gorelov, E. Pavarini, R. Fittipaldi, F. Forte, M. Cuoco, A. Vecchione and F. Parmigiani
Nature of the apical and planar oxygen bonds in the $Sr_{n+1}Ru_nO_{3n+1}$ family (n=1,2,3)
Physical Review B 88, 195143 (2013) (*impact factor: 3.836*)

19. G. Diguet, G.R. Hearne, W.N. Sibanda, **E. Carleschi**, P.Musyimi, V. Pischedda, J.P. Attfield
Possible Wigner-Mott insulator-to-insulator transition at pressure in charge-ordered Fe_2OBO_3
Physical Review B 89, 035132 (2014) (*impact factor: 3.836*)

20. E. Carleschi, B.P. Doyle, R. Fittipaldi, V. Granata, A.M. Strydom, M. Cuoco, A. Vecchione
Double metamagnetic transition in $Sr_4Ru_3O_{10}$
Physical Review B 90, 205120 (2014) (*impact factor: 3.836*)

21. E. Carleschi, B.P. Doyle, J.L. Snyman, E. Magnano, S. Nappini, I. Pis, F. Bondino, P. Peratheepan, A.M. Strydom
Evidence for strong f-d hybridization in the intermetallic ferromagnet $CePdIn_2$
Physical Review B 92, 235137 (2015) (impact factor: 3.836)

22. G.R. Hearne, **E. Carleschi**, W.N. Sibanda, P. Musyimi, G. Diguet, Yu.B. Kudasov, D.A. Maslov, A.S. Korshunov
Coexistence of site- and bond-centered electron localization in the high pressure phase of $LuFe_2O_4$
Physical Review B 93, 105101 (2016) (*impact factor: 3.836*)

23. F. Weickert, L. Civale, B.A. Maiorov, M. Jaime, M.B. Salomon, **E. Carleschi**, A.M. Strydom, R. Fittipaldi, V. Granata, A. Vecchione
Indication for antisymmetric exchange interaction in ferromagnetic $Sr_4Ru_3O_{10}$
Scientific Reports 7, 3867 (2017) (*impact factor: 4.122*)

24. E.T. Mombeshora, A.L. Leigh Jarvis, P.G. Ndungu, B.P. Doyle, **E. Carleschi**, V.O. Nyamori
Some perspectives on nitrogen-doped carbon nanotube synthesis from acetonitrile and N,N'-dimethylformamide mixtures

Materials Chemistry and Physics 199, 435 (2017) (*impact factor: 2.084*)

25. P. Mohanty, A.R.E. Prinsloo, B.P. Doyle, **E. Carleschi**, C.J. Sheppard
Structural and magnetic properties of $(Co_{1-x}Ni_x)Cr_2O_4$ (x = 0.5, 0.25) nanoparticles
AIP Advances 8, 056424 (2018) (*impact factor: 1.568*)

26. T.H. Dolla, K. Pruessner, D.G. Billing, C. Sheppard, A. Prinsloo, **E. Carleschi**, B. Doyle, P. Ndungu
Sol-gel synthesis of $Mn_xNi_{1-x}Co_2O_4$ spinel phase materials: structural, electronic and magnetic properties
Journal of Alloys and Compounds 742, 78-89 (2018) (*impact factor: 3.779*)

27. M.A.M. Ahmed, B.S. Mwankemwa, W.E. Meyer, **E. Carleschi**, B.P. Doyle and J.M. Nel
Effect of Sm doping ZnO nanorods on structural optical and electrical properties of Schottky diodes prepared by chemical bath deposition
Materials Science in Semiconductor Processing 79, 53-60 (2018) (*impact factor: 2.593*)

28. N. Bingwa, S. Bewana, M.J. Ndolomingo, N. Mawila, B. Mogudi, P. Ncube, **E. Carleschi**, B.P. Doyle, M. Haumann, R. Meijboom
Effect of alkali and alkaline earth metal dopants on catalytic activity of mesoporous cobalt oxide evaluated using a model reaction
Applied Catalysis A: General 555, 189-195 (2018) (*impact factor: 4.521*)

29. A.C. Fortuin, C. Jackson, **E. Carleschi**, B.P. Doyle, A. Shnier, R.J. Kriek, S.C. Ray, D.G. Billing, D. Wamwangi, G.G. Scherer, P.B.J. Levecque
Towards Practical Applications of EQCN Experiments to Study Pt Anchor Sites on Carbon Surfaces
Electrocatalysis 9, 271-278 (2018) (*impact factor: 2.889*)

30. F. Weickert, L. Civale, B. Maiorov, M. Jaime, M.B. Salamon, **E. Carleschi**, A.M. Strydom, R. Fittipaldi, V. Granata, A. Vecchione
In-depth study of the H-T phase diagram of $Sr_4Ru_3O_{10}$ by magnetization experiments
Physica B 536, 634-636 (2018) (*impact factor: 1.453*)

31. N. Masunga, B. P. Doyle, **E. Carleschi**, R. Meijboom
Excellent product selectivity towards 2-phenyl-acetaldehyde and styrene oxide using manganese oxide and cobalt oxide NPs for the selective oxidation of styrene
Applied Catalysis A: General 559, 175-186 (2018) (*impact factor: 4.521*)

32. C. Gervas, M. D. Khan, C. Zhang, C. Zhao, R. K. Gupta, **E. Carleschi**, B. P. Doyle, N. Revaprasadu
Effect of cationic disorder on the energy generation and energy storage applications of $Ni_xCo_{3-x}S_4$ thiospinel
RCS Advances 8, 24049-24058 (2018) (*impact factor: 2.936*)

33. G. R. Hearne, S. Bhattacharjee, B. P. Doyle, M. A. M. Ahmed, P. Musyimi, **E. Carleschi**, B. Joseph
Pressure-induced disruption of the local environment of Fe-Fe dimers in $FeGa_3$, accompanied by metallization
Physical Review B 98, 020101(R) (2018) (*impact factor: 5.1, estimated*)

34. A. P. Nono Tchiomo, G. Babu-Geetha, **E. Carleschi**, P. Ngabonziza, B. P. Doyle
Surface characterisation of clean $SrTiO_3(100)$ substrates by x-ray photoelectron spectroscopy
Surface Science Spectra 25, 024001 (2018) (*impact factor: 0.82*)

35. T.H. Dolla, D.G. Billing, C. Sheppard, A. Prinsloo, **E. Carleschi**, B. Doyle, K. Pruessner, P. Ndungu
Mn substituted $Mn_xZn_{1-x}Co_2O_4$ oxides synthesized by coprecipitation; effect of doping on the structural, electronic and magnetic properties
RCS Advances 8, 39837 (2018) (*impact factor: 2.936*)

36. D.E. Vlotman, J.C. Ngila, T. Ndlovu, B. Doyle, **E. Carleschi**, S. Malinga
Hyperbranched polymer membrane for catalytic degradation of polychlorinated biphenyl-153 (PCB-153) in water
Reactive and Functional Polymers 136, 44 (2019) (*impact factor: 2.975*)

37. S.C. Masikane, D.J. Lewis, I. Vitorica-Yrezabal, P.D. McNaughter, B.P. Doyle, **E. Carleschi**, P. O'Brien, N. Revaprasadu
Important phase control of indium sulfide nanomaterials by choice of indium (III) xanthate precursor and thermolysis temperature
European Journal of Inorganic Chemistry 2019, 1421 (2019) (*impact factor: 2.444*)

38. G.B. Geetha, C. Dansou, **E. Carleschi**, B.P. Doyle
Effect of annealing on the surface characteristics of α-Al_2O_3(0001) probed by XPS
Surface Science Spectra 26, 014014 (2019) (*impact factor: 0.82*)

39. R.J. Kriek, M.Z. Iqbal, B.P. Doyle, **E. Carleschi**
Photo-charging of Europium(III) Tellurium Oxide as Photo-electrocatalyst
ACS Applied Energy Materials 2, 4205-4214 (2019) (*impact factor: 4.473*)

40. P. Mohanty, C.J. Sheppard, B.P. Doyle, **E. Carleschi**, A.R.E. Prinsloo
Evolution of NiO Phase at the Expense of Metallic Nickel: Structure, Magnetic and Electronic Properties
Physica B 570, 285-290 (2019) (*impact factor: 1.453*)

41. A. Govender, E.J. Olivier, **E. Carleschi**, E. Prestat, S.J. Haigh, H. van Rensburg, B.P. Doyle, W. Barnard, R.P. Forbes, J.H. Neethling and E. van Steen
Morphological and compositional changes of MFe2O4@Co3O4 (M = Ni, Zn) core-shell nanoparticles after mild reduction
Materials Characterization 155, 109806 (2019) (*impact factor: 4.521*)

42. R. Capelli, P. Maccagnani, F. Dinelli, M. Murgia, M. Bertoldo, M. Montecchi, B.P. Doyle, **E. Carleschi**, L. Pasquali
Understanding adhesion of gold conductive films on sodium-alginate by photoelectron spectroscopy
Thin Solid Films 690, 137535 (2019) (*impact factor: 1.939*)

43. S. Bewana, M.J. Ndolomingo, **E. Carleschi**, B.P. Doyle, R. Meijboom, N. Bingwa
Inorganic perovskite-induced synergy on highly selective Pd-catalyzed hydrogenation of cinnamaldehyde
ACS Applied Materials and Interfaces 11, 36 (2019) (*impact factor: 8.456*)

44. M.Z. Iqbal, **E. Carleschi**, B.P. Doyle, R.J. Kriek
Photocharged Water Splitting Employing a Nickel(II) Tellurium Oxide (Photo)Anode in Alkaline Medium
ACS Applied Energy Materials 2, 8125 (2019) (*impact factor: 4.473*)

45. L. Macheli, A. Roy, **E. Carleschi**, B. Doyle, E. Van Steen
Surface modification of Co_3O_4 nanocubes with TEOS for an improved performance in the Fischer-Tropsch synthesis
Catalysis Today 343, 176 (2020) (*impact factor: 4.667*)

46. P. Mohanty, B.G. Ganga, **E. Carleschi**, C.J. Sheppard, A. Prinsloo
Multiferroic nanoparticle of Ni doped $CoCr_2O_4$: And XPS study
Surface Science Spectra 27, 014003 (2020) (*impact factor: 0.82*)

47. P. Mohanty, S. Chowdhury, R.J. Choudhary, A. Gome, V.R. Reddy, G.R. Umapathy, S. Ojha, **E. Carleschi**, B.P. Doyle, C.J. Sheppard, A.R.E. Prinsloo
Role of Ni Substitution on structural and magnetic properties of epitaxial $CoCr_2O_4$ thin films grown by pulsed laser deposition
Nanotechnology 31, 285708 (2020) (*impact factor: 3.399*)

48. V. Granata, R. Fittipaldi, A. Guarino, A. Ubaldini, **E. Carleschi**, A.M. Strydom, F. Chiarella, A. Vecchione
Crystal growth of the Ca_2RuO_4-Ru metal system by the floating-zone technique
Journal of Alloys and Compounds 832, 154890 (2020) (*impact factor: 4.175*)

49. N. Bingwa, M.J. Ndolomingo, J.-H. Noh, N. Antonels, **E. Carleschi**, B.P. Doyle, M. Haumann, R. Meijboom
Synergistic effect of mesoporous metal oxides and PtO_x nanoparticles in aerobic oxidation of ethanol and ionic liquid induced acetaldehyde selectivity
Molecular Catalysis 492, 110978 (2020) (*impact factor: 2.938*)

50. A. Leudjo Taka, B.P. Doyle, **E. Carleschi**, Y. Fonkui, R. Erasmus, E. Fosso-Kankeu, K. Pillay, X.Y. Mbianda
Spectroscopic characterization and antimicrobial activity of nanoparticles doped cyclodextrin polyurethane bionanosponge
Materials Science & Engineering C 115, 111092 (2020) (*impact factor: 5.08*)

51. C. Njoku, **E. Carleschi**, B.P. Doyle, R.J. Kriek
$Ce_{0.8}Sr_{0.2}Co_xFe_{1-x}O_{3-\delta}$ (x = 0.2, 0.5, 0.8) – a perovskite-type nanocomposite for application in the oxygen evolution reaction in alkaline media
Electroanalysis 32, 3131 (2020) (*impact factor: 2.55*)

52. P. Ngabonziza, **E. Carleschi**, V. Zabolotnyy, A. Taleb-Ibrahimi, F. Bertran, R. Fittipaldi, V. Granata, M. Cuoco, A. Vecchione, B. P. Doyle
Fermi Surface and Electronic Correlations in Band Structure of $Sr_4Ru_3O_{10}$ Probed by Synchrotron-based ARPES
Scientific Reports 10, 21062 (2020) (*impact factor: 3.998*)

53. F. Rubengo, A.R.E. Prinsloo, **E. Carleschi**, P. Mohanty, B.P. Doyle, C.J. Sheppard
Jahn-Teller distorted $Cu_{1-x}Ni_xCr_2O_4$ (x=0, 0.5, 1) nanoparticles
Surface Science Spectra 27, 024015 (2020) (*impact factor: 0.82*)

54. Ludwe L Sikeyi , Themba D Ntuli , Thomas H Mongwe , Nobanathi W Maxakato , **E. Carleschi**, Bryan P Doyle , Neil J Coville, and Manoko S Maubane Nkadimeng
Effect of nitrogen doping and oxygen functionalization on palladium/carbon nano onions electrocatalysts for ethanol oxidation reactions in alkaline electrolyte
International Journal of Hydrogen Energy 46, 10862 (2021) (*impact factor: 4.939*)

55. L.Macheli, **E. Carleschi**, B.P. Doyle, G. Leteba, E. van Steen
Tuning catalytic performance in Fischer-Tropsch synthesis by metal-support interactions
Journal of Catalysis 395, 70 (2021) (*impact factor: 7.723*)

56. P. Mohanty, C. J. Sheppard, B. P. Doyle, **E. Carleschi**, A. R. E. Prinsloo
Jahn-Teller distortions in $(Co_{1-x}Cu_x)Cr_2O_4$ (x = 0.5, 0.25) nanoparticles: Structural, magnetic and electronic properties
AIP Advances 11, 025110 (2021) (*impact factor: 1.579*)

57. Y. Nzuzo, A. Adeyinka, **E. Carleschi**, B.P. Doyle, N. Bingwa
Effect of dz^2 Orbital Electron-Distribution of La-Based Inorganic Perovskites on Surface Kinetics of a Model Reaction
Accepted for publication in Inorganic Chemistry Frontiers (*impact factor: 5.958*)

58. W.M. Mbiombi, D. Wamwangi, B.A. Mathe, R.M. Erasmus, A.G. Every, **E. Carleschi**, B.P. Doyle, D.G. Billing
Tuning the electrical and mechanical properties of diamond-like carbon films by substrate bias voltage
Materials Today Communications 28, 102501 (2021) (*impact factor: 2.678*)

59. M.S. Matseke, H. Zheng, M.K. Mathe, **E. Carleschi**, B. Doyle
Influence of Co doping on physiochemical properties of $MnFe_2O_4$/C nano compounds toward oxygen reduction reaction
Journal of Alloys and Compounds 888, 161581 (2021) (*impact factor: 4.175*)

60. T. Matthews, T.H. Dolla, S.S. Gwebu, T.A. Mashola, L.T. Dlamini, **E. Carleschi**, P. Ndungu, N.W. Maxakato

Mn-Ni-Co spinel oxides towards Oxygen Reduction Reaction in Alkaline Medium: $Mn_{0.5}Ni_{0.5}Co_2O_4$/C synergism and cooperation
Catalysis 11, 1059 (2021) (*impact factor: 4.146*)

61. **E. Carleschi**, A. Chrysostomou, A.S. Cornell, W. Naylor
Probing the effect on student conceptual understanding due to a forced mid-semester transition to online teaching
European Journal of Physics, 43, 035702 (2022) (*impact factor: 0.781*)

62. S. Willenberg, **E. Carleschi**, N. Ross
The Kinetics of Carbon supported Intercalation-type Composites in Aqueous Materials
Accepted for publication in Frontiers in Chemistry (*impact factor: 5,221*)

Articles in peer-reviewed national conference proceedings

1. A.S. Ngankeu, **E. Carleschi**, B.P. Doyle
Low-energy electronic structure of the itinerant metamagnet $Sr_3Ru_2O_7$
Proceedings of SAIP2013: the 58th annual conference of the South African Institute of Physics (ISBN: 978-0-620-62819-8), 116-120 (2014)

2. **E. Carleschi**, B.S. Jacobs
Correlation between mathematics proficiency and performance in a first-year physics course
Proceedings of SAIP2013: the 58th annual conference of the South African Institute of Physics (ISBN: 978-0-620-62819-8), 441-445 (2014)

3. P. Ngabonziza, **E. Carleschi**, B.P. Doyle
Signature of electron-phonon correlation in the band structure of $Sr_4Ru_3O_{10}$
Proceedings of SAIP2012: the 57th annual conference of the South African Institute of Physics (ISBN: 978-1-77592-070-0), 153-157 (2014)

4. M.A.M. Ahmed, **E. Carleschi**, G.R. Hearne, B.P. Doyle
Synthesis and characterization of the semiconducting intermetallic compound $FeGa_3$
Proceedings of SAIP2014: the 59th annual conference of the South African Institute of Physics (ISBN: 978-0-620-65391-6), 2-6 (2015)

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6. W.N. Sibanda, **E. Carleschi**, G. Diguet, C. Martin, G.R. Hearne
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7. W.N. Sibanda, **E. Carleschi**, G. Diguet, V. Pischedda, J.P. Attfield, G.R. Hearne
Pressure induced charge order collapse in Fe_2OBO_3
Proceedings of SAIP2014: the 59th annual conference of the South African Institute of Physics (ISBN: 978-0-620-65391-6), 132-137 (2015)

8. **E. Carleschi**
Understanding of vector addition and subtraction by first year university students: graphical versus algebraic methods
Proceedings of SAIP2016: the 61st annual conference of the South African Institute of Physics (ISBN: 978-0-620-77094-1), 349-354 (2017)

9. C. Dansou, G.B. Geetha, **E. Carleschi**, B.P. Doyle
Growth and structural characterisation of germanium on Pt(111)

Proceedings of SAIP2018: the 63rd annual conference of the South African Institute of Physics (ISBN: 978-0-620-85406-1), 20-24 (2019)

10. A. Chrysostomou, **E. Carleschi**, A.S. Cornell, W. Naylor
Polarising questions in the Force Concept Inventory
Proceedings of SAIP2021: the 65th annual conference of the South African Institute of Physics (ISBN: 978-0-620-97693-0), 412-417 (2022)

Other scholarly publications

1. **E. Carleschi**, E. Magnano, M. Melli, M. Lazzarino
Self-aligned cycloaddition functionalization of cleaved microstructures
Brief report in "Elettra Highlights 2011-2012"

2. G. R. Hearne, S. Bhattacharjee, B. P. Doyle, M. A. M. Ahmed, P. Musyimi, **E. Carleschi**, B. Joseph
Disturbing the Fe-Fe dimers in the semiconducting intermetallic $FeGa_3$ by high pressures yields a peculiar metallic state
Brief report in "Elettra Highlights 2018-2019"

Personal interests

Hobbies:
Ballet; Cello (currently grade 5 adult student); Classical music; Reading; Poetry writing; Photography; Modelling via Instagram (not remunerated) for dancewear brands such as @sodancaeurope, @grishko_southafrica, @cinquieme_kitten, @joburg_ballet #madetomove dancewear collection.

Graded examinations in classical ballet:
1) National Dance Council of America Inc., Bronze Bar of the NDCA Inc. Medal Test Program in Ballet, final mark: *Honours* (equivalent of Pass with Distinction) (1991).
2) Royal Academy of Dancing, UK, Grade 6, Graded examination in classical ballet, final mark: *Honours* (equivalent of Pass with Distinction) (April 2000).
3) Royal Academy of Dancing, UK, Grade 7, Graded examination in classical ballet, final mark: *Honours* (equivalent of Pass with Distinction) (April 2001).
4) Royal Academy of Dance, UK, Grade 8, Graded examination in dance classical ballet, final mark: *Pass with Distinction* (85%, April 2002).

Graded examinations in cello performance:
1) Trinity College London, UK, Grade 1 Cello, Level 1 award in graded examination in music performance, *with distinction* (87%, June 2019)
2) Trinity College London, UK, Grade 4 Cello, Level 2 certificate in graded examination in music performance, *with distinction* (88%, February 2021)

Self-published poetry books:
1) *Images of sand* (https://www.amazon.com/dp/B087972TZB), e-book ASIN: B087972TZB, paperback ISBN-13: 979-8639940255. (Date of publication: April 2020)
2) *A nowhere of eternity* (https://www.amazon.com/dp/B08HB7Y3K2), e-book ASIN: B08HB7Y3K2, paperback ISBN-13: 979-8682202584. (Date of publication: September 2020)
3) *Transient slivers* (https://www.amazon.com/dp/B08QDQY153), e-book ASIN: B08QDQY153, paperback ISBN-13: 979-8578530104. (Date of publication: December 2020)
4) *Bastions on fire* (https://www.amazon.com/dp/B09J4HZ259), e-book ASIN: B09J4HZ259, paperback ISBN-13: 979- 8493658853. (Date of publication: October 2021)

Coursera:
1) *Fundamentals of Graphics Design*, offered by the California Institute of the Arts (completed, grade awarded: 100%)
2) *Introduction to Typography,* offered by the California Institute of the Arts (completed, grade awarded: 94%)

Social media presence:
1) Instagram, personal account: @emanuelacarleschi
2) YouTube:
- https://www.youtube.com/watch?v=dgNmHn3X4iE&t=19s “Teaser: UJ Faculty of Science’s Community Engagement Fundraising Campaign - UJ Science x Art 2021”
- https://www.youtube.com/watch?v=yMXZf9vSkkM “Science x Art 2021: Fundraising Campaign”
- https://www.youtube.com/watch?v=iYfJYS1ggH4 “Science x Art Fundraising Campaign: Behind The Scenes”
- https://www.youtube.com/watch?v=HIPM49SPeZg “Capsule Collection – Landscapes of Femininity” (final year BA fashion design collection by Ms Kaylee Ann Chotia, Department of Fashion Design, UJ)
- https://www.youtube.com/watch?v=LX591vNwifc (from 13m10s to 20m35s) “Senseless Kindness”, within “Professorial Inauguration: Prof Catherine F. Botha” (in collaboration with the Department of Philosophy, UJ)