Serena Martha Coetzee
Curriculum Vitae

Personal details

Full names	Serena Martha Coetzee
Maiden name	Krüger
Date of birth	20 July 1968
ID Number	680720 0034 082
Gender	Female
Citizenship	South African
Language proficiency	*English, Afrikaans, German*: read, write, speak; *Tswana*: speak (limited)
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Biographical overview

Serena is Professor and Head of the Department of Geography, Geoinformatics and Meteorology at the University of Pretoria (UP) and an NRF rated researcher (C1). She started her career as a software engineer on the global software development teams of desktop GIS products. Subsequently, as director and project manager at AfriGIS, she led GIS projects ranging from geospatial data collection, manipulation and maintenance to geocoding, spatial analysis and Internet GIS until she joined the University of Pretoria in 2006.

Serena's research focuses on the ever-increasing volumes of geographic information and the challenges of making the information available, accessible and usable. The research is of an interdisciplinary nature, mainly in geoinformatics and computer science. Specific research foci are address data, standards, open principles, geovisualization and geoinformatics education. Her research has revealed the delicate balance between stakeholders across different levels of governments for making national datasets available, accessible and usable.

Serena serves on the Editorial Boards of Transactions in GIS, the International Journal of Digital Earth, the International Journal for Cartography, Big Earth Data and Spatial Information Research Journal. Together with international peers, she has co-edited special issues in ISI journals, e.g., on open geospatial science and technologies. She has acted as program chair, proceedings editor and scientific committee member for national and international conferences, including the scientific committees of peer-reviewed conferences organized by the Global Spatial Data Infrastructure Association (GSDI), Open Source Geospatial Foundation (FOSS4G conferences), International Cartographic Association (ICA) and Association of Geographic Information Laboratories for Europe (AGILE). She was responsible for the scientific programme of the 31st International Cartographic Conference 2023 (ICC 2023), held in Cape Town, South Africa. Serena has also delivered invited presentations and keynotes at several international events and conferences.

In 2023, Serena was elected as one of the Vice Presidents of the International Cartographic Association (ICA). Before, she chaired the Commission on SDIs and Standards from 2015 to 2023. A current initiative explores how the ICA can contribute to standardization in the Open Geospatial Consortium (OGC) by sharing cartographic knowledge and terminology, including the development of cartographic terminology in African languages. Serena actively participates in international geographic information standardization efforts through the International Organization for Standardization's (ISO) technical committee ISO/TC 211, Geographic Information/Geomatics, and nationally through the South African Bureau of Standards (SABS) mirror committee. She led the work on ISO 19160-1, Addressing Part 1: Conceptual model, and is currently leading the work on ISO 19160-2, Addressing Part 2: Assigning and maintaining addresses for objects in the physical world. She was also the project lead for different parts of SANS 1883, *Geographic information -- Addresses*. These standards facilitate the assignment of addresses, e.g., in former townships, rural areas and informal settlements, and they contribute to online validation of addresses required for e-commerce and e-governance.

Serena is currently serving her second term as representative of the Council on Higher Education (CHE) on the South African Committee for Spatial Information (CSI), which coordinates the implementation of the South African Spatial Data Infrastructure (SASDI). Previously, she represented the CHE on the South African Geomatics Council, the South African professional body for surveyors and GISc professionals.

1. Qualifications

2009: PhD Computer Science, University of Pretoria, South Africa
1997: MSc Computer Science *cum laude*, University of Pretoria, South Africa
1991: Higher Education Diploma, University of Pretoria, South Africa
1990: BSc (Hons) Computer Science *cum laude*, University of Pretoria, South Africa
1989: BSc (Computer Science & Mathematics), University of Pretoria, South Africa
1986: Matric. Distinctions in English, Afrikaans, German, Natural Science, Biology, Latin. Other: Mathematics, Music.

2. Professional registration and memberships

Since 2014, registered as Geomatics Professional (GISc) (GPr GISc1245) with the South African Geomatics Council
2007-2014, registered as Geomatics Technologist (GISc) (G0637) with the South African Geomatics Council
Member of the Geo-information Society of South Africa (GISSA)
Member of the South African Institute for Computer Science and Information Technology (SAICSIT)
Senior Member of the Institute of Electrical and Electronics Engineers (IEEE)
Member of the Association for Computing Machinery (ACM)

3. Awards

2022: Gold Medal Award, Society of South African Geographers (SSAG), honorary awards in recognition of meritorious contribution to Geography in South Africa
2019: Finalist, 'TW Kambule-NSTF Awards: Researchers', National Science and Technology Foundation (NSTF)
2019: Runner up, Geo-information Society of South Africa (GISSA) award, 'Advancement of the geospatial industry'.
2015: Addressing Solution Design Challenge, Universal Postal Union (UPU)
2009: SABS award in recognition of the contribution to the development of SANS 1883

4. Employment history

Department of Geography, Geoinformatics and Meteorology, University of Pretoria, South Africa, 2/2011 to date	Professor and Head of Department (10/2018 –) Acting Head of Department (3/2018 – 9/2018) Associate Professor (2014 – 9/2018) Senior Lecturer (2011 – 2013)
Centre for Geoinformation Science, University of Pretoria, South Africa, 2/2011 – 7/2019	Acting Director (2011 – 3/2015) Director (4/2015 – 7/2019)
Department of Computer Science, University of Pretoria, South Africa, 1/2006 – 1/2011	Senior Lecturer (2010) Lecturer (2006 – 2009)
AfriGIS, Pretoria, South Africa, 5/1999 – 12/2005	Client and Project Manager (10/2002 – 12/2005) Operational Director (9/2000 – 9/2002) Web Solutions Unit Manager (5/1999 – 8/2000)
Infotech, Pretoria, South Africa, 3/1999 – 4/1999	Development Associate
Citadel Investment Solutions, Pretoria, South Africa, 8/1998 – 2/1999	Software Engineer
Autodesk Development (Africa), Pretoria, South Africa, 8/1995 – 7/1998	Software Engineer
Automated Methods, Pretoria, South Africa, 3/1993 – 7/1995	Software Developer
Interface Connection (GmbH), Munich, Germany, 1/1992 – 12/1992	Programmer (Internship)

5. Courses presented

Undergraduate module	**Level**	**Period**	**Self-developed**
GMC 110, Cartography	First year	4th Quarter, since 2017	Yes
GIS 120 Geoinformatics	First year	2nd Semester 2012-2016	Yes
GMT 320 Geoinformatics project	Third year	2nd Semester 2014	Yes
COS 151 Introduction to Computer Science	First year	1st Semester 2009-2010	Yes
COS 130 Introduction to Programming	First year	1st Semester, 2006-2008	2006: No, 2007-2008: Yes
COS 326 Database Systems	Third year	2nd Semester, 2007-2010	Yes
COS 343 IT Trends	Third year	2nd Semester, 2006	No
COS 333 Programming Languages	Third year	1st Semester, 2006	No
Postgraduate module	**Level**	**Period**	**Self-developed**
GIS 705 Advanced geospatial data	Honours (4th year)	3rd Quarter 2020-2021 2nd Quarter since 2022	Yes
GIS 701 Research methods	Honours (4th year)	1st Quarter since 2016	Yes
GIS 703 GIS Professional Practice (formerly UNI 791 GIS Professional Practice)	Honours (4th year)	1st Semester 2011-2019	Yes
GIS 702 Research Project (formerly UNI 792 GIS Project)	Honours (4th year)	2011-2020	Yes
COS 787 Spatial databases (formerly BTI 720)	Honours (4th year)	1st Semester 2010-2016 2nd Semester 2009	Yes

VRS 780 Distributed Systems	Honours (4th year)	2nd Semester, 2006 1st Semester, 2007-2008	No
Courses presented to industry	**Duration**	**Year**	**Presenting institution**
GISc professional practice	4 months (6 contact days)	2013-2017, 2019, 2022	CE at UP / Enterprises UP
Introduction to geographic information standards	2 days	2009-2011, 2014, 2015	CE at UP
Spatial databases with PostGIS	5 days	2012-2014	CE at UP
GIS for Transportation Engineers under the auspices of the SA Institute of Civil Engineers (SAICE)	2 days	2008	CE at UP
Intiendo Address Toolset Training	2 days	2002 to Telkom 2003 to Vodacom 2004 to FNB 2005 to Discovery Health	AfriGIS

6. Peer-reviewed publications

Gertrud Schaab, **Serena Coetzee**, Nerhene Davis and Faith N. Karanja (2023). Developing teaching/learning materials on 'Sense of Place' with students in an international university cooperation: overall approach and first phase outcomes at Karlsruhe University of Applied Sciences, *International Journal of Cartography*, 9(3), 525-540. https://doi.org/10.1080/23729333.2023.2224487

Samy Katumba, **Serena Coetzee**, Alfred Stein and Inger Fabris-Rotelli (online). Using spatial indices to measure dynamic racial residential segregation in Gauteng province (South Africa). *South African Geographical Journal*, 105(1), 1-33, https://doi.org/10.1080/03736245.2021.1997793

Serena Coetzee, Sanet Carow and Lourens Snyman, 2022. A review of maps in PhDs: Is your map worth a 1000 words? *The Cartographic Journal* 59(2):150-164, https://doi.org/10.1080/00087041.2021.2006980.

Barend Van der Merwe, Nelishia Pillay and **Serena Coetzee,** 2022. An application of CNN to classify barchan dunes. *Aeolian Research*, Volume 56, 100801. https://doi-org.uplib.idm.oclc.org/10.1016/j.aeolia.2022.100801

Dinao Tjia and **Serena Coetzee**, 2022. Geospatial information needs for informal settlement upgrading – A review. *Habitat International*, Volume 122, 102521. https://doi-org.uplib.idm.oclc.org/10.1016/j.habitatint.2022.102531

Lindy-Anne Siebritz, Ahmad Desai, Antony K Cooper, **Serena Coetzee**, 2021. Capacitating local governments for the digital earth vision: lessons learnt from the role of municipalities in the South African spatial data infrastructure. *International Journal of Digital Earth 14(12):1897-1917*. https://doi.org/10.1080/17538947.2021.1998680

Susan Henrico, **Serena Coetzee** and Antony K Cooper (2021). The role of age, gender, experience, education and professional registration in acceptance of QGIS in South Africa. *Transactions in GIS*, 00, 1–16. https://doi.org/10.1111/tgis.12857

Serena Coetzee, Lourens Snyman and Rhena Delport, 2021. Revealing the value of geospatial information with isochrone maps for improving the management of heart attacks in South Africa, *International Journal of Cartography*, https://10.1080/23729333.2021.1919847.

Aphiwe Madubedube, **Serena Coetzee** and Victoria Rautenbach, 2021. Contributor-Focused Intrinsic Quality Assessment of OpenStreetMap in Mozambique Using Unsupervised Machine Learning. *ISPRS Int. J. Geo-Inf.*, 10(3), 156. DOI: https://doi.org/10.3390/ijgi10030156.

Gertrud Schaab, Sybil Adams and **Serena Coetzee**, 2021. Drawing attention via diversity in thematic map design, as demonstrated by student maps of Northern South Africa. *International Journal of Cartography*, https://doi.org/10.1080/23729333.2020.1839207.

Susan Henrico, **Serena Coetzee**, Antony K Cooper and Victoria Rautenbach, 2020. Understanding the acceptance and use of open source geospatial software – The case of QGIS in South Africa. *Transactions in GIS*, 25:468490, https://doi.org/10.1111/tgis.12697.

Bolelang Sibolla, Terence van Zyl and **Serena Coetzee**, 2021. Determining real time patterns of lightning strikes from sensory observations. *Journal of Geovisualization and Spatial Analysis*, 5(4), https://doi.org/10.1007/s41651-02000070-7.

Gertrud Schaab, Sybil Adams and **Serena Coetzee**, 2020 online. Conveying map finesse: thematic map making essentials for today's university students, *Journal of Geography in Higher Education*, https://doi.org/10.1080/03098265.2020.1850656.

Ivan Henrico, Susan Henrico and **Serena Coetzee**, 2020. A comparison between two DEM products to calculate a visibility analysis for military operations using FOSSGIS, *Geogr. Fis. Dinam. Quat.* 43(2020), DOI 10.4461/GFDQ.2019.43.6.

Susan Henrico, **Serena Coetzee** and Antony K Cooper, 2020. Is open source GIS feasible in military operations? Evaluation by application of a use case. *Scientia Militaria* 48(1):41-60. DOI: 10.5787/48-1-1259.

Edward Kurwakumire, **Serena Coetzee** and Peter MU Schmitz, 2020. Towards monitoring and managing the production of cadastral information in land information infrastructures using supply chain mapping and the Supply Chain Operations Reference (SCOR) model. *South African Journal of Geomatics* 9(2):163-178. DOI: http://dx.doi.org/10.4314/sajg.v9i2.12

Serena Coetzee, Martijn Odijk, Bastiaan Van Loenen, Janette Storm and Jantien Stoter, 2020. Stakeholder analysis of the governance framework of a national SDI dataset – Whose needs are met in the buildings and address register of the Netherlands? *International Journal of Digital Earth, 13(3).* *https://doi.org/10.1080/17538947.2018.1520930*

Serena Coetzee, Ivana Ivánová, Helena Mitasova, Maria A. Brovelli, 2020. Open geospatial software and data: a review of the current state and a perspective into the future, *ISPRS International Journal of Geo-Information, 9(2)*.

Serena Coetzee, Siegfried Vanlishout, Raf Buyle, Veerle Beyaert, Lindy-Anne Siebritz and Joep Crompvoets, 2020 online. Changing stakeholder influences in managing authoritative information – the case of the Centraal ReferentieAdressenBestand (CRAB) in Flanders, *Journal of Spatial Science*, https://doi.org/10.1080/14498596.2019.1650301

Jean Brodeur, **Serena Coetzee**, David Danko, Stephane Garcia and Jan Hjelmager, 2019. Geographic Information Metadata—An Outlook from the International Standardization Perspective. *ISPRS Int. J. Geo-Inf.*, *8*, 280.

Raf Buyle, Ziggy Vanlishout, **Serena Coetzee**, Dieter De Paepe, Mathias Van Compernolle, Geert Thijs, Bert Van Nuffelen, Laurens De Vocht, Björn De Vidts, Peter Mechant, Erik Mannens, 2019. Raising Interoperability among Base Registries: The Evolution of the Linked Base Registry for Addresses in Flanders, *Journal of Web Semantics*, 55:86-101.

Bolelang Sibolla, **Serena Coetzee** and Terence van Zyl, 2018. A Framework for Visual Analytics of Spatio-Temporal Sensor Observations from Data Streams. *ISPRS International Journal of Geo-Information*, 7(12)1-28.

Aphiwe Madubedube, Victoria Rautenbach and **Serena Coetzee**, 2018. Investigating the impact of different types of directions on wayfinding efficiency in an informal settlement. *South African Journal of Geomatics*, 7 (2):164 - 176.

Lilija Friesen, Gertrud Schaab, **Serena Coetzee**, Victoria Rautenbach, Tessa Marcus and Jannie Hugo, 2018. Community oriented primary care (COPC) in the City of Tshwane (South Africa) – A web map application in support of responsive and dynamic health care, *Kartographische Nachrichten*, 4:173-182.

Serena Coetzee and Victoria Rautenbach, 2017. A design pattern approach to cartography with big geospatial data. *The Cartographic Journal*, 54(4):301-312.

Samy Katumba and **Serena Coetzee,** 2017. Employing Search Engine Optimization (SEO) Techniques for Improving the Discovery of Geospatial Resources on the Web. *ISPRS International Journal of Geo-Information,* 6(9):284304.

Yvette Bevis, Gertrud Schaab, Victoria Rautenbach and **Serena Coetzee**, 2017. Expert opinions on using the third dimension to visualise wind speed uncertainty in wind farm planning, *International Journal of Cartography,* 3(1):61-75.

Keagen Liebenberg, Ansie Smit, **Serena Coetzee**, Andrzej Kijko, 2017. A GIS approach to seismic risk assessment with an application to Johannesburg, South Africa, *Acta Geophysica*, 65(4): 645-657.

Serena Coetzee, Stefan Steiniger, Barend Köbben, Adam Iwaniak, Iwona Kaczmarek, Petr Rapant, Antony K Cooper, Franz-Josef Behr, Govert Schoof, Samy Katumba, Rumiana Vatseva, Kisco Sinvula and Harold Moellering, 2017. The Academic SDI – Towards understanding spatial data infrastructures for research and education. In: *Advances in Cartography and GIScience - Selections from the International Cartographic Conference 2017*, edited by Michael Peterson, Springer.

Kisco M Sinvula, **Serena Coetzee**, Antony K Cooper, Wiafe Owusu-Banahene, Emma Nangolo, Victoria Rautenbach, Martin Hipondoka, 2017. A comparative analysis of stakeholder roles in the spatial data infrastructures of South Africa, Namibia and Ghana. *International Journal of Spatial Data Infrastructure research (IJSDIR),* 12:1-12.

Victoria Rautenbach, **Serena Coetzee** and Arzu Cöltekin, 2017. Development and evaluation of a specialized task taxonomy for spatial planning – A map literacy experiment with topographic maps. *ISPRS Journal of Photogrammetry and Remote Sensing, Vol 126, pp16-26*.

Sibusisiwe Hlela, **Serena Coetzee** and Antony Cooper, 2016. Evaluating a Public Sector Organisation for SDI Readiness – The Case of a South African Government Department, *South African Journal of Geomatics,* 5(2):95107.

Victoria Rautenbach, **Serena Coetzee**, Danie Jooste 2016. Results of an evaluation of augmented reality mobile development frameworks for addresses in informal settlements, *Spatial Information Research*, *24(3):211-223*.

Victoria Rautenbach, Yvette Bevis, **Serena Coetzee** and Carin Combrinck, 2015. Evaluating procedural modeling for 3D models of informal settlements in urban design activities, *South African Journal of Science* (SAJS), 111(11/12):1-10.

Serena Coetzee and Julian Smit, 2015. Development of an observatory for spatial planning in South Africa: a best practice review. *South African Journal of Geomatics,* 4(3):326-338.

Isak Du Plessis, Keagen Liebenberg, Ansie Smit, **Serena Coetzee** and Andrzej Kijko, 2015. Preliminary investigation into the cause of acid mine water induced seismicity in Johannesburg. *South African Journal of Geomatics,* 4(3):299-308.

Paddington Hodza, Gertrud Schaab, **Serena Coetzee**, Fritz Van der Merwe and B Vogt, 2015. Comparing proportional compositions of geospatial technology-related programs at three universities. *South African Journal of Geomatics,* 4(3):40-249.

Samy Katumba and **Serena Coetzee**, 2015. Enhancing the online discovery of geospatial data through taxonomy, folksonomy and semantic annotations. *South African Journal of Geomatics,* 4(3):339-350.

Serena Coetzee and Brendon Wolff-Piggott, 2015. A Review of SDI Literature: Searching for Signs of Inverse Infrastructures. In: *Lecture Notes in Cartography – Maps Connecting the World*, edited by Robbi Sluter, Claudia, Madureira Cruz, Carla Bernadete, Leal de Menezes, Paulo Márcio, Springer, pp113-127.

Serena Coetzee, Victoria Rautenbach and Heindrich du Plessis, 2015. A qualitative comparison of South Africa's geomatics professional body's academic model against industry's understanding of SDI knowledge and skills requirements, *Journal of Geography in Higher Education*, 39(1):4-17.

Serena Coetzee, Sanet Eksteen and Adrian Roos, 2014. Results from a survey of the South African GISc community show who they are and what they do. *South African Journal of Geomatics*, 3(2):224-245.

Serena Coetzee, Sanet Eksteen and Christopher Grundling, 2013. Sustainable Development: The Contribution from GISc Education in South Africa. *South African Journal of Geomatics,* 2(3):246-259.

Dinao Tjia and **Serena Coetzee**, 2013. Application of the Land Administration Domain Model to the City of Johannesburg Land Information System, *South African Journal of Geomatics,* 2(3):260-279.

Malete Daniel Sebake and **Serena Coetzee**, 2013. Address Data Sharing: Organizational Motivators and Barriers and their Implications for the South African Spatial Data Infrastructure, *International Journal of Spatial Data Infrastructure (IJSDIR)*, Vol. 8:1-15.

Byron Ludwig and **Serena Coetzee**, 2013. Implications of security mechanisms and Service Level Agreements (SLAs) of Platform as as Service (PaaS) clouds for geoprocessing services, *Applied Geomatics,* 5(1):25-32.

Rautenbach V, **Coetzee S** and Iwaniak A, 2013. Orchestrating OGC web services to produce thematic maps in a spatial information infrastructure, *Computers Environment and Urban Systems*, 37:107-120.

Antony K Cooper, Harold Moellering, Jan Hjelmager, Petr Rapant, Tatiana Delgado, Dominique Laurent, David M Danko, Paloma Abad, Ulrich Düren, **Serena Coetzee**, Adam Iwaniak, Abbas Rajabifard, Michel Huet, and Jean Brodeur, 2013. A spatial data infrastructure model from the computational viewpoint, *International Journal of Geographical Information Science (IJGIS)*, 27(6):1133-1151.

Serena Coetzee and Sanet Eksteen**,** 2012. Tertiary education institutions in Africa: Cloudy with a chance of GISc education in some countries, *South African Journal of Geomatics,* 1(2):119-132.

Malete Daniel Sebake and **Serena Coetzee**, 2012. Results of three case studies for assessing motivators and barriers of address data sharing in South Africa. *South African Journal of Geomatics*, 1(1): 32-43

Serena Coetzee, 2012. Reference model for a data grid approach to address data in a dynamic SDI. *Geoinformatica*, 16(1):111-129.

Serena Coetzee, 2011. Results from a normative dependency analysis of geographic information standards. *Computer Standards and Interfaces*, 33(5): 485-493, DOI: 10.1016/j.csi.2011.02.004.

Antony K Cooper, **Serena Coetzee** and Derrick Kourie, 2010. Perceptions of virtual globes, volunteered geographical information and spatial data infrastructures, *Geomatica*, 64(1):73-88.

Serena Coetzee and Judith Bishop, 2009. Address databases for national SDI: Comparing the novel data grid approach to data harvesting and federated databases, *International Journal of Geographical Information Science (IJGIS),* 23(9):1179-1209.

Serena Coetzee and Antony K Cooper, 2007. What is an address in South Africa?, *South African Journal of Science (SAJS)*, 103(11/12):449-458.

Serena Coetzee and Judith Bishop, 1998. A new way to query GIS on the web, *IEEE Software*, 15(3):31-40.

7. Standards development

ISO 19160-2 (under development), *Addressing – Part 2: Assigning and maintaining addresses for objects in the physical world*, International Organization for Standardization (ISO), Geneva, Switzerland (Contribution: project lead).

ISO 19160-3:2020, *Addressing – Part 3: Address data quality,* International Organization for Standardization (ISO), Geneva, Switzerland (Contribution: project member).

ISO 19160-4:2017, Addressing – Part 4: *Addressing – Part 4: International postal address components and template language*, International Organization for Standardization (ISO), Geneva, Switzerland (Contribution: project member).

SANS 1883-2:2018, *Geographic information – Address, Part 2: Address data exchange.* South African Bureau of Standards (SABS), Pretoria, South Africa, 2018. (Contribution: project member).

ISO 19160-1:2015, *Addressing – Part 1: Conceptual Model*, International Organization for Standardization (ISO), Geneva, Switzerland (Contribution: project lead).

SANS 1883-1:2009, *Geographic information – Address, Part 1: Data format of addresses.* South African Bureau of Standards (SABS), Pretoria, South Africa, 2009. (Contribution: project lead).

SANS 1883-3:2009, *Geographic information – Address, Part 3: Guidelines for address allocation and updates*. South African Bureau of Standards (SABS), Pretoria, South Africa, 2009. (Contribution: project lead).

8. Technical reports

Online Guide to the Role of Standards in Geospatial Information Management (first edition), developed and maintained for the UN GGIM by the International Organization for Standardization Technical Committee 211, the Open Geospatial Consortium (OGC) and the International Hydrographic Organization (Contribution: lead author for the Introduction). http://standards.unggim.ogc.org/index.php

Coetzee S, Gould M, McCormack B, Sadiq Z, Scott G, Kmoch A, Alameh N, Strobl J, Wytzisk A, Devarajan T, 2021. *Towards a sustainable geospatial ecosystem beyond SDIs*, Position Paper for the 11th Session of the United Nations Global Geospatial Information Management (UN GGIM), https://ggim.un.org/meetings/GGIMcommittee/11th-Session/documents/Towards_a_Sustainable_Geospatial_Ecosystem_Beyond_SDIs_Draft_3Aug2021.pdf

Coetzee S, Cooper AK and Katumba S, 2020. *Strengthening governance in the Gauteng City-Region through a spatial data infrastructure – The case of address data*. #05 in the *Governing the GCR provocation series*. Johannesburg: Gauteng City Region Observatory https://gcro.ac.za/research/project/detail/governing-the-gcr/ (Contribution: main author).

Coetzee S, Steiniger S, Köbben B, Iwaniak A, Kaczmarek I, Rapant P, Cooper AK, Behr F-J, Schoof G, Katumba S, Vatseva R, Sinvula KM and Moellering H, 2017. SDI implementations at universities and research institutes. Available online at http://sdistandards.icaci.org/resources/ (Contribution: main author).

ISO/TC 211, *Geographic information/Geomatics,* 2015. *Recommendations for the specification of cultural and linguistic adaptability (CLA) in ISO/TC 211 standards*. Document number N3936. (Contribution: main author).

Serena Coetzee and Julian Smit, 2014. *Background research to inform the setting up of the observatory proposed in Chapter 8 of the National Development Plan*. Research Report for the Secretariat of the National Planning Commission of South Africa.

Open Geospatial Consortium (OGC), ISO/TC 211, Geographic information/Geomatics, and the International Hydrographic Organization (IHO), 2014. *A Guide to the Role of Standards in Geospatial Information Management*. Background document for the fourth session of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) in New York, USA, August 2014. Available online at http://ggim.un.org/ggim_committee.html. (Contribution: contributing author).

Open Geospatial Consortium (OGC), ISO/TC 211, Geographic information/Geomatics, and the International Hydrographic Organization (IHO), 2014. *A Guide to the Role of Standards in Geospatial Information Management – Companion Document on Standards Recommendations by Tier*. Background document for the fourth session of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) in New York, USA, August 2014. Available online at http://ggim.un.org/ggim_committee.html. (Contribution: contributing author).

ISO/TC 211, *Geographic information/Geomatics*, in cooperation with the Open Geospatial Consortium (OGC) and the International Hydrographic Organization (IHO), 2013. *The UN-GGIM inventory of issues and geographic information standardization*. Background document for the third session of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) in Cambridge, United Kingdom, July 2013. Available online at http://ggim.un.org/ggim_committee.html. (Contribution: main author).

Serena Coetzee, 2012. *Executive summary: Availability of spatial data for renewable energy planning*, Eskom, Midrand, South Africa.

ISO/TC 211, *Geographic information/Geomatics*, 2011. *Review summary of ISO 19160, Addressing,* (ISO/TC 211 document number N3188). Available online at http://www.isotc211.org/address/iso19160.htm, (Contribution: project lead).

9. Supervision history

Postgraduate students I have supervised or co-supervised: 7 PhD, 17 Masters (research) and 9 Masters (coursework), two of the latter from a university in Germany. I have also supervised 36 BScHonours projects, which are at a similar level to Masters projects in the European Bologna system.

Barend van der Merwe (2023). *Classifying barchan outlines into morphological classes using convolutional neural networks: a proof of concept.* **PhD Geography**, University of Pretoria.

Sibusiswe Hlela (2022). *Towards understanding geographic information competencies: The case of decision-making in environmental impact assessments in South Africa.* **PhD Geography**, University of Pretoria, co-supervisor: Antony Cooper.

Bolelang Sibolla (2021). *A visual analytics framework for streaming spatio-temporal sensor observations*, **PhD Geoinformatics**, University of Pretoria, co-supervisor: Terence van Zyl.

Susan Henrico (2020). *Understanding the acceptance and use of open source geospatial software – The case of QGIS in South Africa,* **PhD Geoinformatics**, University of Pretoria, co-supervisor: Antony K Cooper.

Victoria Rautenbach (2017). *The use of 3D geovisualisations for urban design: The case of informal settlement upgrading in South Africa,* University of Pretoria, **PhD Geoinformatics**, co-supervisor: Arzu Çöltekin.

Antony K Cooper (2016). *An exposition of the nature of volunteered geographical information and its suitability for integration into spatial data infrastructures,* **PhD Information Technology**, University of Pretoria, co-supervisor: Derrick Kourie.

Wiafe Owusu-Banahene (2016). *Linked data and thematic web services,* **PhD Geoinformatics**, University of Pretoria.

Brenda-Ai Maina (2022). *Assessing an exploratory digital environment for learning about southern African pre-colonial urbanism in space and time: a case study for Seoke, the capital of the Bangwaketse.* **MSc Geoinformatics**, University of Pretoria, co-supervisor: Victoria Rautenbach, Stefania Merlo.

Azile Mdleleni (2022). *Perceptions about the value of addresses and address data in South Africa.* **MSc Geoinformatics**, University of Pretoria, co-supervisor: Victoria Rautenbach.

Cameron Green (2021). *Managing, organising and sharing fine-grained data in the spatial design disciplines – _An evaluation of a GeoNode prototype.* **MSc Geoinformatics**, University of Pretoria, co-supervised with Victoria Rautenbach as main supervisor.

Larissa Pillay (2021). *A workflow for producing thematic maps from univariate big geospatial point data.* **MSc Geoinformatics**, University of Pretoria, co-supervisor: Victoria Rautenbach.

Sam Motswenyane (2021). *Exploring Custodianship Roles and Responsibilities for Cadastral Data in the Context of the South African Spatial Data Infrastructure.* **MSc Geoinformatics**, University of Pretoria, co-supervisors: Antony Cooper and Nicolene Fourie.

Aphiwe Madubedube (2021). *Characterising OpenStreetMap Contributors – The Case of Mozambique.* ***M IT (Data Science),*** University of Pretoria, co-supervisor: Victoria Rautenbach.

Yashena Naidoo (2021). *An evaluation of alternatives to conventional addressing in two informal settlements of South Africa.* **MSc Geoinformatics**, University of Pretoria, co-supervisor: Victoria Rautenbach.

Luqmaan Hassim (2021). *Determining Leading Indicators for Spatiotemporal Prediction of Harmful Algal Blooms from Remotely Sensed Data in the Benguela Current of South Africa,* **M IT (Data Science)**, University of Pretoria, co-supervisors: Victoria Rautenbach, Bolelang Sibolla.

Matthias Beier (2018). *Visualizing Gauteng transport data for different audiences including a survey on their understanding,* **International Geomatics Masters**, Karlsruhe University of Applied Sciences, Germany, cosupervisor: Gertrud Schaab.

Yvette Bevis (2018). *Exploring the usability and suitability of different techniques for visualizing uncertainty in 3D maps for regional level wind farm planning,* **MSc Geoinformatics**, University of Pretoria, co-supervisor: Victoria Rautenbach.

Lili Friesen (2017). *Concept of a web mapping application for gaining knowledge from patient health data: The case of a community oriented primary care programme in the City of Tshwane, South Africa,* **International Geomatics Masters**, Karlsruhe University of Applied Sciences, Germany, co-supervisor: Gertrud Schaab.

Melissa Burgess (Hankel) (2017). *Evaluation of fire danger and fire potential indices for South Africa: Case studies in Mpumalanga and the Western Cape,* **MSc Geoinformatics**, University of Pretoria, co-supervisors: Phillip Frost and Graeme McFerren.

Lourens Snyman (2017). *Optimising geographic accessibility in rural areas: A case study of the Thusong Service Centres in Limpopo Province,* **MSc Geoinformatics**, University of Pretoria.

Wesley Walford (2017). *Evaluating the use of neural networks to predict river flow gauge values.* **MSc Geoinformatics**, University of Pretoria, co-supervisor: Terence van Zyl.

Susan Henrico (2017). *Analysing the practical feasibility of using free and open source software for geographic information systems (FOSSGIS) in military operations,* **MSc Geoinformatics**, University of Pretoria, co-supervisor: Antony Cooper.

Samy Katumba (2017). *Empirical tests using search engine optimisation techniques to compare the effectiveness of two metadata vocabularies for geospatial data discovery on the Web.* MSc Geoinformatics, University of Pretoria.
Lauren Hankel (2015). *Processing geospatial big data in a hybrid cloud,* **MSc Geoinformatics**, University of Pretoria, co-supervisor: Graeme McFerren.

Jared Jacobson (2015). *Assessing OpenGL for 2D rendering of geospatial data.* **MSc Computer Science**, University of Pretoria, co-supervisor: Derrick Kourie.

Noh Tewolde (2015). *Evaluating a semantic approach to address data interoperability,* **MSc Computer Science**, University of Pretoria.

Dinao Tjia (2014). *Towards a land administration data model (LADM) profile for South Africa*. **MSc Geoinformatics**, University of Pretoria.

Victoria Rautenbach (2013). *Orchestrating standard web services to produce thematic maps in a geoportal of a spatial data infrastructure,* **MSc Geoinformatics**, University of Pretoria.

Jacob Modiba (2013). *Towards the design and implementation of a spatial online analytical processing (SOLAP) methodology,* **M IT**, University of Pretoria.

Daniel Sebake (2012). *Assessing the motivators and barriers of interorganizatonal GIS data sharing for address data in South Africa,* **M IT**, University of Pretoria.

Sarel Esterhuizen (2011). *Leveraging distributed software development - A Distributed Maturity Framework based Case Study Perspective on South African Readiness,* **M IT**, University of Pretoria.

Eddie Carpenter (2008). *Empirical comparison of PHP with JAVA as a platform for the implementation of Web Services solutions,* **M IT**, University of Pretoria.

Zama Vara (2008). *Can Open Source Software (OSS) like Linux really reduce the Total Cost of Ownership (TCO) of Information Systems?* **M IT**, University of Pretoria.

10. Academic citizenship leadership roles

2023–, Vice President on the Executive of the International Cartographic Association (ICA) www.icaci.org.

2023, Chair of the Scientific Committee of the 31st International Cartographic Conference, Cape Town, South Africa, 13-18 August 2023.

2022–, Member of the International Advisory Board of the United Nations Global Geodetic Centre of Excellence (UN-GGCE)

2021–, Member of the Advisory Board of the *Mapping Africa's Endangered Archaeological Sites and Monuments (MAEASaM)* project, https://maeasam.org/advisory-board/

2017–2021, South African head of delegation to the bi-annual plenary weeks of the ISO/TC 211, *Geographic Information/Geomatics*

2016–2023, Strategic Board Member of the *UN Open GIS Initiative*, http://unopengis.org/unopengis/

2016–2019, Member of the Advisory Board of the *GeoForAll* Initiative.

2015–2023, Chair of the *Commission on Geoinformation Infrastructures and Standards* of the International Cartographic Association (ICA).

2013–2015, Vice Chair of the *Commission on Geoinformation Infrastructures and Standards* of the International Cartographic Association (ICA).

2008-2019, Chair of the *Programme Maintenance Group (PMG)* of the ISO/TC 211, *Geographic Information/Geomatics*.