

Overview

A total of 85 degrees were conferred by the Department over the course of the year; with 49 students receiving BSc degrees, 29 honours degrees, three MSc degrees, and four MRTM degrees. Recirculation resulted in the introduction of three new undergraduate programmes, with Geology and Chemistry, Physics, and Geography as majors. The Department was responsible for the presentation of six undergraduate and three honours programmes, as well as the master's degree in Mineral Resource Throughput Management (MRTM). The Department supervised a total of 11 MSc candidates and three PhD candidates.

Ms Huibrie Pretorius (Junior Lecturer: Mineralogy) resigned during the course of the year. Several new junior lecturers joined the Department in 2014; including Ms Thendo Mapholi, Ms Rinae Makhadi, and Mr Raimund Rentel. Prof. Marian Tredoux was retained on contract for 2014, and Ms Megan Purchase was appointed as Analytical Scientist – taking responsibility for the maintenance and operation of the Department's analytical infrastructure. Dr Robert Hansen joined the Department as an affiliated lecturer, Profs Leon Jacobson and Robert Schouwstra as affiliated associate professors, and Prof. Reyno Scheepers as an affiliated professor. Ms Justine Magson was nominated to replace Dr Hermann Praekelt as programme director, and served alongside Dr Praekelt in his capacity as programme director over the course of the year. Mr Adriaan Odenaal, our sedimentologist, was promoted to lecturer.

One of the highlights of the year was the outfitting of the Department's core storage facility with shelving capable of storing approximately 20 km of drill core material that will be used for training students in the important art and science of core logging. The official opening that took place in May was attended by Drs Dirk Harney (Anglo American) and Oupa Nkagisang (AngloGold Ashanti).

Activities and Achievements

It was a busy year as usual with undergraduate and honours students embarking on numerous field trips across the country and with staff members travelling both

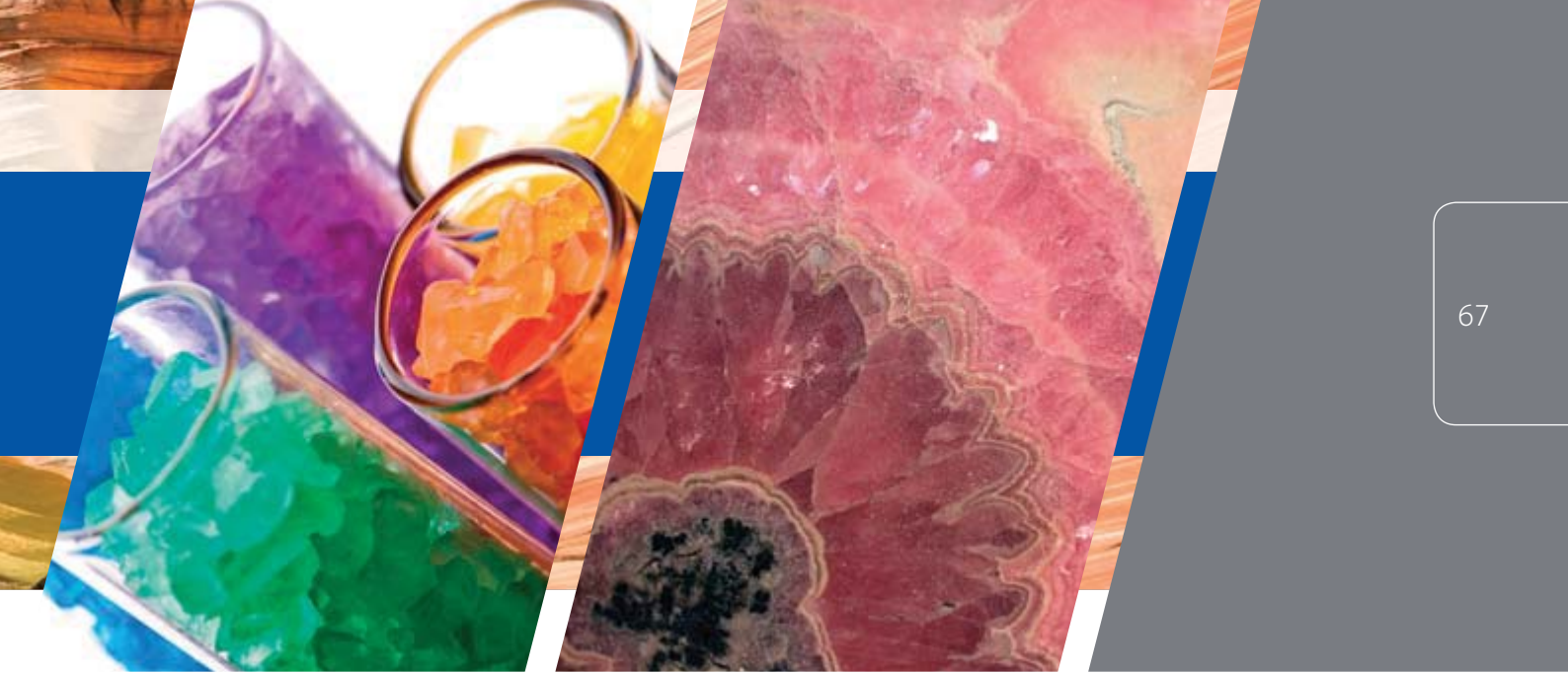
locally and abroad. Staff members and students presented their work at several conferences; including the 12th International Platinum symposium (Yekaterinburg, Russia), the 21st General Meeting of the International Mineralogical Association (Sandton Convention Centre), the Igneous and Metamorphic Studies Group Meeting (Rhodes University), and the European Geosciences Union General Assembly (Vienna). Profs Marian Tredoux and Christoph Gauert and Dr Freddie Roelofse attended a workshop organised by the International Continental Scientific Drilling Programme to discuss matters related to a potential drilling project in the Bushveld Complex.

The year also saw the birth of the Kovsie Geotalks series; a series of talks aimed at i) increasing academic discourse within the Department, ii) exposing students to the work of non-Kovsie researchers, academics, and industry professionals, and iii) allowing the broader public access to the wonders of geology. Speakers included Mr Felix Yebo Amoako (Friedrich-Schiller University), Prof. Duncan Miller (affiliated professor at the Department), Prof. Jan Kramers (University of Johannesburg), and Dr Gerrie van Aswegen (Institute of Mine Seismology). The Department also hosted Prof. Nic Beukes (University of Johannesburg) for the delivery of the 33rd Alex du Toit Memorial Lecture presented under the auspices of the Geological Society of South Africa. The year also saw the establishment of the Geological Student Association, which organised several social and academic events over the course of the year.

Prof. Christoph Gauert was awarded sabbatical leave between April and July to further his research on gold fingerprinting and the PGE mineralogy of the chromitite layers of the eastern Bushveld Complex, which he spent at the Museum für Naturkunde in Berlin. He also organised and led a pre-conference field trip for the 21st General Meeting of the International Mineralogical Association to the eastern Bushveld and Uitkomst complexes.

Dr Johann Claassen represented the Department and the Faculty of Natural and Agricultural Sciences at the 3rd Mining Lekgotla held at Gallagher Estate in August.

An exchange student from the Martin Luther University Halle-Wittenberg, Ms Melanie Krüger, visited the Department



Mr Adriaan Odendaal conducting fieldwork in the Sutherland district as part of his PhD study on the sedimentology of the Beaufort Group along the Great Escarpment (Salpeterkop visible in the distance).

for several months to conduct research on the metamorphic contact aureole of the Uitkomst Complex.

Twenty-four MRTM students attended the programme's annual Winter School hosted by the Department during the week of 14 July 2014. The school focused on the practical application of MRTM and flow principles to bring about positive change in the mining environment. Emphasis

was placed on improving mining profitability through enhancing product payability. Guest speakers for this part of the school were Messrs PG Laurens and A Dunne. Other invited guest speakers were Prof. H Kotze and Dr P Mensah from the UFS Postgraduate School. Invaluable information and practical skills were transferred to assist MRTM students with the completion of their mini-dissertations. A review of the programme was initiated in October 2014 in

order to enhance the throughput rate for the programme and to transform it from a master's degree to a Master of Science course.

Achievements of Students

An MSc student of Dr Freddie Roelofse, Mr Mpho Mangwegape, was appointed as pre-doctoral fellow of the Carnegie Institution for Science and spent several weeks in the Department of Terrestrial Magnetism performing LA-ICP-MS Sr-isotopic determinations on plagioclase of the Bushveld Complex. Ms Jarlen Beukes (MSc student of Prof. Christoph Gauert) returned from a seven-month stay at the Karl-Franzens University of Graz, Austria, which was funded by Erasmus Mundus.

Special Achievements

Dr Freddie Roelofse was elected as Fellow of the Gemmological Association of Great Britain following the successful completion of the association's Diploma in Gemmology. He also received generous funding from

the Thuthuka funding instrument of the NRF to conduct research on mineral-scale disequilibrium within the Bushveld Complex and was appointed a visiting investigator at the Carnegie Institution for Science. He was appointed as chair of the Palaeoproterozoic Taskgroup of the South African Committee for Stratigraphy, and onto the editorial board of *Die Suid-Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie*.

Community Service

The Department once again hosted the Free State leg of the Minquiz National Science Competition, which was held on 15 May 2014. A total of 26 schools (mostly from the Free State), each represented by three learners, took part in the competition. The learners were also afforded the opportunity of visiting the departments of Chemistry, Physics, and Geology in order to see what these departments have on offer for prospective students. The Department was also involved in numerous other outreach activities, including the UFS Astrofair, the National Science Week launch, and the Eskom Expo for young scientists.



Core-shelving in the Department's core storage facility. The facility was officially opened in May 2014.

Research Outputs

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Research Articles

Bindi, L., Tredoux, M., Zaccarini, F., Miller, D.E. & Garuti, G. 2014. Non-stoichiometric nickel arsenides in nature: The structure of orcelite, $Ni_{3-x}As_2$ ($x=0.25$), from the Bon Accord oxide body, South Africa. *Journal of Alloys and Compounds* 601: 175-178.

Colliston, W.P., Schoch, A.E. & Cole, J. 2014. The Grenvillian Namaqua-Natal fold belt adjacent to the Kaapvaal craton: 1. Distribution of Mesoproterozoic collisional terranes deduced from results of regional surveys and selected profiles in the western and southern parts of the fold belt. *Journal of African Earth Sciences* 100: 7-19.

Harris, C., Holngwane, W., Gule, N. & Scheepers, R. 2014. Origin of tanzanite and associated gemstone mineralization at Merelani, Tanzania. *South African Journal of Geology* 117: 15-30.

Killick, D. & Miller, D. 2014. Smelting of magnetite and magnetite-ilmenite iron ores in the northern Lowveld, South Africa, ca. 1000 CE to ca. 1880 CE. *Journal of Archaeological Science* 43: 239-255.

Mielke, C., Boesche, N.K., Rogass, C., Kaufmann, H., Gauert, C. & De Wit, M. 2014. Space-borne mine waste mineralogy monitoring in South Africa. Applications for modern push-broom missions: Hyperion/OLI and EnMap/Sentinel-2. *Remote Sensing* 6: 6790-6816.

Tredoux, M., Roelofse, F. & Shukolyukov, A. 2014. A Cr isotopic study of the Bon Accord NiO body in the Barberton greenstone belt, South Africa. *Chemical Geology* 390: 182-190.

Zaccarini, F., Tredoux, M., Miller, D.E., Garuti, G., Aiglsperger, T. & Proenza, J.A. 2014. The occurrence of platinum-group element and gold minerals in the Bon Accord Ni-oxide body, South Africa. *American Mineralogist* 99: 1774-1782.



Mr Mpho Mangwegape, MSc student at the Department and pre-doctoral fellow of the Carnegie Institution for Science, at the Smithsonian Institution National Museum of Natural History in Washington D.C., USA.

Staff

Professor: Prof. WA van der Westhuizen.

Associate Professors: Profs WP Colliston, CDK Gauert, and M Tredoux.

Senior Lecturers: Drs JO Claassen, HE Praekelt, and F Roelofse.

Junior Lecturers: Mmes J Magson, R Makhadi, T Mapholi, HCF Pretorius, Messrs AI Odendaal and R Rentel.

Affiliated Academic/Research Staff: Profs GJ Beukes, DE Miller, R Scheepers, AE Schoch, Drs JC Loock, L Nel, PJ

Pretorius, H Prinsloo, Messrs AC Dunne, PJ Grobler, PG Laurens, and MJAR Vrijens.

Secretary: Mrs PS Swart.

Administrative Officer: Mrs R Immelman.

Technical Support Staff: Messrs J Choane, A Felix, and D Radikgomo.

Contact Details

Dr F Roelofse

Department of Geology
Faculty of Natural and Agricultural Sciences
University of the Free State
P.O. Box 339
Bloemfontein
9300
South Africa

Telephone: +27 51 401 2515
Fax: +27 51 401 3815
Email: roelofsef@ufs.ac.za
Website: www.ufs.ac.za