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BANDED IRON FORMATION-RELATED HIGH-GRADE IRON ORE

Editors
S. Hagemann, C. Rosière, J. Gutzmer, and N.J. Beukes

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AUTHOR BIOGRAPHIES

Dennis J. Alchin is a senior exploration geologist with Kumba Iron Ore (Pty) Ltd and currently manages the Sibelo iron ore exploration project in the Northern Cape province of South Africa. He completed his B.Sc. (Hons) degree in 1980 at the University of Stellenbosch and earned his M.Sc. degree from the same institution in 1993, with a thesis study investigating the structural and stratigraphic setting of the Rosh Pinah zinc deposit in the Gariep belt in Namibia. He has authored and co-authored several papers on the Gariep belt and Rosh Pinah zinc deposit, as well as on the Sishen South iron ore deposit in the Northern Cape province of South Africa.

Franciscus Jacobus Baars is a South African born and educated Dutch geologist and permanent resident of Brazil with an M.Sc. degree in metamorphic geology, under Dr. John Moore, from the University of Cape Town. He has performed geologic cartography of four sheets at a 1:100,000 scale in the Espinhaço Range and has worked widely in Brazil and shield South America, mainly on exploration geology for De Beers Consolidated, Companhia Vale do Rio Doce (Vale), and as an independent consultant for, among others, the Brazilian Geological Survey-Companhia de Pesquisa de Recursos Minerais, Pan Brazilian, Minmet, Caraíba Metais, Gold Fields, Eldorado Gold Corp., Lara Exploration, IMS-Jaguar Resources, EBX, GME4-Global Minerals Exploration, ERM-Engenharia de Recursos Minerais, MMX, Fundação Gorceix, Kinross, BHP-Billiton Metals, Anglogold Ashanti, Mineração Santa Blandina, and Amarillo Gold, on a broad range of commodities, including gold, diamonds, iron, manganese, alumina, base metals, PGM, Ni, rutile, Ti, kaolin, phosphate, and potash. At the Survey, Baars coordinated the conceptual GIS plan and the mineral resource compilation, as a key fourth author for the 1:2,500,000 geologic, mineral resources, and geotectonic map of Brazil, published in 4 sheets and in DVD-GIS format with some 210 co-authors. He has authored a chapter on the São Francisco craton in the 1995 Oxford University Press volume on greenstone belts and has co-authored a number of peer-reviewed papers, most particularly focusing on the metallogenic evolution of the Carajás mineral province.

David Belton completed his B.Sc. (Hons) at James Cook University North Queensland. He was a senior research scientist with CSIRO Exploration and Mining in Melbourne, Victoria, until 2007.

Nicolas J. Beukes was born and raised in Harrismith, South Africa. He studied at the University of the Orange Free State and the Rand Afrikaans University in Johannesburg, where he obtained his Ph.D. degree in 1978. He worked for two years at the Geological Survey of South Africa before joining the Department of Geology at the former Rand Afrikaans University (now known as the University of Johannesburg) in late 1969. There he was appointed full professor in 1986, acted as chair of the geology department from 1996 to 2002, and is currently co-leader of the Paleoproterozoic Mineralization Research Group (PPM) in the department. His research career focused on the study of Precambrian iron and manganese formations and he gained international standing for his work on depositional environments in the Paleoproterozoic. His biggest strength remains field geology and sedimentary basin analyses. He is recipient of the Jubilee Medal and Draper Award of the Geological Society of South Africa and Honorary Fellow of the Geological Society of America. In 2005 he was selected as SEG Regional VP Lecturer for 2006.

Harendranath Bhattacharya graduated from the Jadavpur University, Kolkata. He obtained his Ph.D. degree from the same university. His main area of interest is ore geology and sedimentology. He has taught geology for more than 30 years and currently he is the head of the geology department, Presidency College, Kolkata.

Adrian J. Boyce received a B.Sc. degree in geology from the University of Glasgow in 1980, and a Ph.D. degree in applied geology from the University of Strathclyde, in 1990, for his research into the origin of Irish-type Zn-Pb-Ba deposits. Since 1985 he has worked at the Scottish Universities Environmental Research Centre, where he has published widely on the application of stable isotope analyses to the understanding of a large variety of ore deposits, through collaboration with colleagues in the UK and across the world. He is currently a member of Council of the Society for Geology Applied to Mineral Deposits (SGA), and on the editorial board of *Mineralium Deposita*. He is a Fellow of the SEG, for which he has recently completed a stint on the Fellowship Committee. He maintains a strong commitment to applying the principles and practice of stable isotope analyses to genetic modeling of ore deposits, particularly through postgraduate training and development.

Philip E. Brown received a B.A. degree from Carleton College (1974) and M.S. (1976) and Ph.D. (1980) degrees in economic geology from the University of Michigan. Since 1981, he has taught at the University of Wisconsin-Madison, where he is professor of economic geology and teaches a range of undergraduate and graduate classes, many with a significant field component. He has undertaken research projects on several continents and has focused on fluid inclusions and gold deposits for the past 20 years. Present research interests include magnetic studies of layered mafic intrusions, Phanerozoic vein and disseminated gold in Nevada, and characterizing the fluids involved with the development of the historic iron districts of North America.

John B. Chapman is a postdoctoral fellow in the Mineral Deposits Division of the Geological Survey of Canada. He received am M.Geol. degree from the University of Southampton in 2003, before moving to the Royal School of Mines at Imperial College London, where he received a Ph.D. degree in isotope geochemistry in 2007. His doctoral research focused on elucidating the fractionation of transition metal stable isotopes—principally Fe, Cu, and Zn—in ore-forming systems. Chapman's current research concerns the development of multiproxy geochemical vectoring tools for mineral deposit exploration within the Archean Abitibi district of Ontario and Quebec, Canada, as well as further development

of metal isotope analysis techniques for application to mineral deposit studies.

Benny Chisonga is a Zambian geologist currently winding up his Ph.D. studies in economic geology at the University of Johannesburg, South Africa. His project focus is on "Mafic dykes and sills—their role on the control and distribution of high-grade banded iron formation-hosted iron and manganese deposits in South Africa." He earned his B.Sc. degree in geology from the University of Zambia in 2002. After a brief stint with the Geological Survey in Zambia, he moved to South Africa to join the Paleoproterozoic Mineralization (PPM) Research Group in the geology department at the University of Johannesburg. He was awarded an M.Sc. geology, cum laude, at the University of Johannesburg in 2005. He has interests in exploration for and exploitation of base metals, ferrous metals, and energy minerals. He is also passionate about the financial and business side of mining, small-scale mining enterprise, and investment.

John Clout is currently the head of resources for Fortescue Metals Group Limited and is a recognized expert in the international iron and steel industry, having spent 12 years working at the CSIRO in roles including science adviser for mine processing. He previously advised companies such as Rio Tinto, BlueScope, OneSteel, Robe River, Hancock Prospecting, and Hope Downs on their international metallurgical strategies. Clout is prominent in the fields of iron ore, mineralogy, and technical marketing. He received a bachelor of science degree, ore mineralogy, from the University of Sydney, and a doctorate in ore petrology, mineralogy, and structural geology from Monash University.

Ian L. Cope is currently an independent geologic consultant. He received a B.Sc. degree in applied geology from Oxford Brookes University in 1996. He subsequently joined Rio Tinto as a field geologist and worked on base and precious metal exploration projects in Sweden, Italy, Greenland, Australia, and Mali. From 2001 to 2003 he worked on the Simandou iron ore project in the Republic of Guinea, before undertaking research on the Pic de Fon deposit, for which he was awarded a Ph.D. degree in 2008 from the Royal School of Mines at Imperial College London.

Hilke Jacob Dalstra was born in the Netherlands and achieved a "Doctoraal" (M.Sc. equivalent) in structural and economic geology "with distinction" from the University of Utrecht, The Netherlands, in 1988. After military service, he went on to Ph.D. studies on the subject of Archean lode gold deposits at The University of Western Australia in Perth, Australia, and graduated with "special congratulations" in 1995. After working briefly as a consultant in gold exploration, he joined the Hamersley Iron Resources Task Force in late 1995 and worked in iron ore exploration in the Hamersley Basin until 2000. He then joined Rio Tinto Exploration and is now working as a senior principal geologist in a global role, mainly focused on iron ore exploration. He has published several articles on lode-gold tectonics and iron ore genesis in renowned journals, and in 2005 and 2007 received the Rio Tinto Discovery Award for significant iron ore discoveries in the Pilbara region of Western Australia.

Michiel O. de Kock obtained an M.Sc. degree in geology from the Rand Afrikaans University, South Africa, in 2003, and completed a Ph.D. degree on the paleomagnetism of selected Neoarchean and Paleoproterozoic cover sequences of the Kaapvaal craton in 2007 at the same university, which has now been renamed the University of Johannesburg. He undertook postdoctoral work at Yale University for a year before returning to the University of Johannesburg, where he is a lecturer and responsible for the paleomagnetic laboratory. His research interests include reconstructing the Kaapvaal craton through the Precambrian by means of paleomagnetism and the application of the paleomagnetic method to elucidate the origins and timing of economic mineral deposits such as iron oxide copper-gold, uranium, and iron ore deposits. He is also trying to establish magnetostratigraphies across Phanerozoic mass extinction records as preserved in the Karoo sedimentary basin of South Africa.

David A. D. Evans is professor of geology and geophysics at Yale University (2002–present), having completed earlier postdoctoral work at The University of Western Australia (1998–2001) and doctoral studies at the California Institute of Technology (1992–1998). His research interests center on the assembly and dispersal histories of pre-Pangean supercontinents, using paleomagnetism as a primary technique in conjunction with constraints from the global tectonic record. The historical record of supercontinents can be used to specify long-term patterns of mantle convection and crustal evolution, and to provide a paleogeographic framework for cyclic and secular trends in life's environment at the Earth's surface. Evans is co-leader of International Geoscience Programme (IGCP) Project 509, Paleoproterozoic supercontinents and global evolution.

Rosaline Cristina Figueiredo e Silva is Brazilian-born and received a B.Sc. degree in geology from the Federal University of Minas Gerais in 2002, with project focus on the Engenho D´Água orogenic gold deposit in the Archean Quadrilátero Ferrífero greenstone belt. She received her M.Sc. degree from the same university in 2004. Her M.Sc. project addressed the petrography and geochemistry of jaspilites and hard iron ores from the Serra Norte iron ore deposits in the Archean-Proterozoic Carajás mineral province. She is currently a Ph.D. student under Prof. Lydia M. Lobato, researching the genesis of the Serra Norte iron ore deposits. She was a visiting Ph.D. student at the Centre for Exploration Targeting (CET), University of Western Australia, from 2005 to 2006, working with Steffen Hagemann on an integrated hydrothermal alteration and fluid model for the Carajás iron ore deposits. As part of this study she conducted laser ICP-MS analyses on oxides and carbon, oxygen, and sulfur isotope analyses at the University of Tasmania (CODES), oxygen and hydrogen analyses at the University of Lausanne, and in situ laser ablation and bulk ion chromatography on

fluid inclusions at the University of Leeds. Figueiredo e Silva has been a teaching assistant for undergraduate economic geology classes. Since 2000 she also has worked as a consultant, conducting petrographic studies on a variety of hydrothermal ore deposits, including orogenic and epithermal gold (Quadrilátero Ferrífero regions, Tocantins, Tapajós, and Lavras do Sul), iron (Serra Norte Carajás deposits, Mato Grosso, Piauí), and manganese (Morro da Mina deposit) deposits.

Marcus Flis graduated from the University of Adelaide with a B.Sc. (Hons) degree in 1979 and the University of Utah with an M.Sc. degree in 1985. He worked for CRA Exploration and Newcrest Mining in the capacity of exploration geophysicist. During this time, he was involved in multicommodity exploration, principally gold, base metals, coal, and industrial minerals. In 1996 Marcus accepted a position as exploration manager for Hamersley Iron Pty Ltd, where the focus was on exploring for bedded, detrital, and channel iron deposits. He then joined Rio Tinto Iron Ore's business development team as project manager, involved in merger and acquisition activities, business improvement, and industry intelligence. Marcus is currently the CEO of Royal Resources Ltd, an iron and uranium explorer based in Perth, Western Australia. His primary interest is the application of geophysics to the difficult and ambiguous task of iron exploration.

Jens Gutzmer holds a research chair in geometallurgy at the Department of Geology, University of Johannesburg. He received his Diplom in Mineralogy from the Technical University of Clausthal-Zellerfeld (Germany) in 1993, followed by a Ph.D. in geology from the Rand Afrikaans University (South Africa) in 1996. Together with Nic Beukes, he co-founded and continues to lead of the Paleoproterozoic Mineralization Research Group at the University of Johannesburg. His research interests focus on the development of quantitative analytical methods to characterize the mineralogy and texture of ores and ore-forming systems for use in geometallurgical research, as well as the understanding of the evolution of System Earth in the Precambrian Era and its influence on the metallogenesis of sediment-hosted mineral deposits. He is a recipient of the President Award of the National Research Foundation of South Africa (1999), the Waldemar E. Lindgren Award of the Society of Economic Geologists (2002), and the TWAS Award of the Academy of Sciences of South Africa (2007).

Steffen Hagemann is an associate professor in economic geology at the Centre for Exploration Targeting at the University of Western Australia. He received his M.Sc. degree from the University of Wisconsin-Milwaukee and Madison in 1989 and his Ph.D. degree from the University of Western Australia (Key Centre for Strategic Mineral Deposits) in 1993. His Ph.D. thesis focused on the structural and hydrothermal alteration and chemistry control of the Archean orogenic-epizonal Wiluna lode-gold deposits. After holding postdoctoral positions at the University of Wisconsin-Madison, with stints at the University of Toronto, he took a position as an assistant professor at the Technical University of Munich in 1996. In 1997, he accepted a position as a lecturer in economic geology at the University of Western Australia. Hagemann has more than 20 years experience in the research for ore deposits; he worked on the structure, hydrothermal alteration, and fluid chemistry of Archean orogenic gold deposits in Australia, Canada, and Brazil, mostly funded by industry, and has conducted research on Carlin-type gold deposits in China, intrusion-related gold mineralization in Canada and Brazil, and ancient VHMS systems in the Pilbara craton. He has a particular interest in translating genetic ore deposit models into testable exploration criteria, concepts, and targets. Recently, his Ph.D. students and postdoctoral fellows have concentrated research work on high-grade BIF-hosted iron deposits in the Hamersley province and Yilgarn craton in Western Australia, and the Quadrilátero Ferrífero (Iron Quadrangle) and Carajás in Brazil. Hagemann has been invited to be keynote speaker at various academic-, mining-, and exploration-related conferences and has been asked to provide short courses for industry and academics.

Colin J. Harris is presently the General Manager Project Generation and acting General Manager Operations on Rio Tinto Iron Ore's Simandou project in the Republic of Guinea, West Africa. He joined Rio Tinto in 1990 and, prior to his transfer to RTIO in 2004, Colin was Rio Tinto Africa/Europe Region's exploration manager for Western Europe and Western Africa.

Richard J. Herrington is an economic geologist at The Natural History Museum in London, UK, leader of the Mineralogy and Origins of Ore Deposit Programme. He received his B.Sc. degree from the Royal School of Mines, Imperial College, London, in 1980 and worked as an exploration geologist in Europe for Cominco until 1987. He received his Ph.D. degree from the Royal School of Mines, London, in 1991, working on the origins of gold deposits in the Midlands greenstone belt of Zimbabwe. Since 1991 and after joining The Natural History Museum, Richard has undertaken research into a range of mineral deposit types, including VMS deposits in a range of settings from the modern sea floor to recent deposits in Indonesia, Mesozoic deposits in the United States and Cyprus, and Paleozoic deposits in the Urals of Russia and Kazakhstan. Part of his Urals research work contributes to the integrated research program at The Natural History Museum, investigating the settings of mineral deposits in the Altaid collage in Central Eurasia under the CERCAMS initiative. More recently, his research has extended into the understanding the mineralogy and the processes of formation of nickel laterite and iron oxide deposits.

Vanessa Lickfold started her B.Sc. degree work in 1986 at the University of the Witwatersrand, South Africa, and achieved her honors degree in 1991. She began her working career with Iscor Ltd as a production and exploration geologist in coal, base metals, and heavy minerals before commencing part-time study for her M.Sc. degree in exploration, which she completed in 1998. She then embarked on Ph.D. work in Australia, which she completed in 2002. On returning

to South Africa, she resumed her professional career with Kumba Resources (previously Iscor) as a mineral resource and evaluation geologist, becoming the person responsible for the reporting of mineral resources and ore reserves in 2005. With the creation of a new company, Kumba Iron Ore, in late 2006, she has taken on the responsibility of managing the geology department for the company.

Lydia Maria Lobato is Brazilian born and graduated in 1978 from the Rio de Janeiro Federal University geology department. She obtained her Ph.D. degree in 1985 at the University of Western Ontario, Canada, under Prof. William S. Fyfe, completing a thesis on the Proterozoic hydrothermal Lagoa Real uranium deposit in Bahia, Brazil. Dr. Lobato has been a professor at the geology department, Minas Gerais Federal University, Brazil, since 1989, after spending 10 years as a geologist at Nuclebrás, the Brazilian State uranium exploration company. She teaches graduate economic geology and postgraduate hydrothermal ore deposits. Her research focuses on orogenic gold deposits in the Archean Quadrilátero Ferrífero greenstone belt, and on the Archean-Proterozoic Carajás mineral province iron deposits. Her supervision of 21 M.Sc. and 3 Ph.D. students predominantly concentrates on the metallogenesis of gold deposits in greenstone belts and on the genesis of hydrothermal iron deposits. Publications include editorship and authorship of titles in Nature, Economic Geology, Mineralium Deposita, Ore Geology Reviews, a chapter in the GAC book on VMS, and peer-reviewed Brazilian publications. Prof. Lobato has lectured in an invited capacity at GAC-MAC, PDAC, and SIMEXMIN, and has co-represented the Brazilian postgraduate geosciences at the Ministery of Education from 2002 to 2006. She interacts very closely with the mining and exploration industry by way of receiving financial research support, offering applied courses, and consulting.

John McLellan has B.Sc. (Hons.) and Ph.D. degrees in economic geology from James Cook University, where he is currently employed as a senior research scientist in the Economic Geology Research Unit (EGRU). His early research specialized in structural controls of mineralization and numerical modeling of deformation-induced fluid flow in hydrothermal systems, for which he worked closely with the CSIRO in Perth, Western Australia. Since completing of his doctorate, he has worked as a postdoctoral fellow with the Predictive Mineral Discovery Cooperative Research Centre (pmd*CRC), continuing his research in deformation and thermally induced fluid flow in hydrothermal systems. His research interests have covered several major mineral systems, including Archaean gold systems, Hamersley iron ores, Mt Isa Pb-Zn-Ag systems, Cu and Fe oxide Cu-Au, with particular reference to mineral exploration. His current interests include geothermal systems in New Zealand and dynamic analysis of seismic events with respect to fluid migration through the earth's crust, stress and strain partitioning during deformation, and the role of basement rocks in mineralizing systems.

Pieter J. Mienie graduated from the University of the Orange Free State, South Africa. He completed his M.Sc. work on the origin of the Ti-V magnetite deposits of the Rooiwater Complex in the Limpopo province of South Africa, at the University of Pretoria. He worked as exploration geologist for 13 years on base metals in Namibia and magnetite occurrences in South Africa for Iscor Ltd, followed by 5 years as senior exploration geologist at Sishen iron ore mine for the same company. For the past 8 years he has been working for Kumba Resources and later Kumba Iron Ore in Pretoria, South Africa, in principal iron ore projects, responsible for global and RSA-based iron ore exploration projects.

Roberta Morais received her B.Sc. degree in geology from the University of Ouro Preto in 2002. Since then, she has worked as a structural geologist for Vale in several different mineral deposit types, including copper, gold, and iron. She is now researching mineralization at Sossego as part of her work toward an M.Sc. degree. Her interests include shear zones and associated mineralization, including sedimentary rocks, magmatism, hydrothermal systems, and crustal evolution.

Joydip Mukhopadhyay graduated with honors in geology in 1984 from Presidency College, Kolkata, under the University of Calcutta, India. He completed his master's degree in geology from the same institution in 1986 and subsequently earned a Ph.D. degree in science from the Jadavpur University, Kolkata. During his postdoctoral fellowship tenure at the University of Johannesburg and through a number of sponsored projects, he worked on the BIF and BIF-hosted high-grade iron ore deposits of India and South Africa. Joydip has taught geology to graduate and postgraduate students for about 20 years. At present, he teaches at the Presidency College, Kolkata, India. His main area of interest is sedimentology and stratigraphy of Precambrian carbonate platforms and Archean greenstone belts.

Deon Nel graduated from the Tshwane University of Technology, Pretoria, in 2004. He has been involved in iron ore exploration on the BIF-hosted Sishen South high-grade ore, magnetite and hematite skarn deposits of Falémé, Senegal, detrital deposits of high-grade hematite in the Northern Cape province of South Africa, and with oolitic iron ore deposits. He is currently an exploration geologist and project leader on the Sishen South project for Kumba Iron Ore. He is busy with an ongoing study on the difference between bulk and dry density for iron ore and its effects on resource estimation.

Ivan A. Oliveira received his B.Sc. degree in geology from the Federal University of Rio Grande do Sul in 1998, with specialization in environmental management from Senai/GO in 2005. He has worked in exploration for industrial minerals in Quaternary and Proterozoic terranes for seven years, and for three years he has been employed by Companhia Vale do Rio Doce (now, Vale) as a contract geologist, working on modeling of the iron formations of the Carajás mineral province.

Nick Oliver has a B.Sc. (Hons.) degree from University of Queensland and a Ph.D. degree in earth sciences from Monash, specializing in structural and petrological aspects of

fluid-rock interaction. He was a geologist in 1982 with Renison Goldfields, between degrees, and after his doctorate he worked with CSIRO and the Geophysical Laboratory (Washington, D.C.) in 1988–1989 on a postdoctoral fellowship concerned with sulfur isotopes in metamorphosed black shales. During lectureships with Monash (1990–1993) and Curtin (1994–1996) he developed a research interest in the application of geomechanics and geochemistry to giant hydrothermal systems. He took up the Economic Geology chair at JCU in 1997, and was director of EGRU from 1998 until 2005, head of the School of Earth Sciences in 2006, and deputy head of Earth and Environmental Sciences in 2007, returning to the EGRU directorship in 2008. His research interests straddle geochemical and structural controls on fluid flow, IOCG, iron ores, Pb-Zn, lode gold, large hydrothermal systems, and numerical modeling of fluid flow and fluid-rock geochemical reactions. Current work is focused on Mount Isa (copper), southern Brazil (gold), and northern New Zealand (geothermal systems). He has supervised or co-supervised 65 postgraduate students, including 25 Ph.D. candidates, as well as arranged and supervised 10 postdoctoral fellows. He has coordinated a large number of conferences, short courses, and field trips for industry. Nick currently serves on the Australian Research Council College of Experts Physics Chemistry and Earth Sciences panel.

Erick R. Ramanaidou graduated from the University of Poitiers, France. He completed his Ph.D. work on the genesis of iron ore in the Iron Quadrangle in Brazil as part of a collaboration between the University of Poitiers and the University of São Paulo, Brazil. He is currently a senior principal research scientist at the CSIRO Exploration and Mining in Perth, Western Australia. He is the iron ore commodity leader in CSIRO and the principal point of contact for the iron ore industry. He has led numerous research projects on iron ore classification and genesis and has developed ore grade measurement systems that have had a major impact on the Australian iron ore industry. He is also co-chairman and editor of the International Iron Ore Conference (2002, 2005, and 2007).

Francisco Javier Rios graduated with a degree in geology from UNLP-National University of La Plata, Argentina, in 1987, and received his M.Sc and doctoral degrees in geochemistry and economic geology, respectively, from Federal University of Pará, Brazil. His work focused on mineralized fluids associated with the Serra dos Carajás and Musa granites in the eastern Amazon. In 1994, he participated in a research program for the INREMI-UNLP, Argentina, on epithermal resource studies in southern Patagonia. He then worked, from 1996 to 1997, as postdoctoral fellow at the CNEN-Brazilian Nuclear Energy Commission and École des Mines in Saint Etienne, France, where he developed fluid inclusion studies in pegmatites and W-skarns from Minas Gerais, Brazil. In 1998, Francisco joined the Center of Nuclear Technology Development (CDTN, a federal research center of CNEN in Belo Horizonte, Brazil), as researcher and professor of the graduate course on technology of radiation, minerals, and materials that he also coordinated from 2005 to 2007. Beginning in 2008, he has coordinated activities focused on the geology of mineral deposits and has researched fluid inclusions and the metallogeny of uranium deposits (Lagoa Real, Brazil), BIF-hosted iron deposits (Quadrilátero Ferrífero and Serra dos Carajás areas, Brazil), and Fe skarns in Argentina.

Carlos Alberto Rosière graduated from the Ouro Preto School of Mines, Brazil, in 1974 with a degree in geological engineering. He earned a Ph.D. degree in natural sciences from the University of Clausthal, Germany, in 1981, focusing on structural geology and iron ore from the Pico de Itabira deposit at the Quadrilátero Ferrífero. Afterward, he held postdoctoral fellowships at the Universities of Aachen and Clausthal (Germany) and research positions at the RAU (South Africa) and the UWA (Australia). Carlos worked in exploration and mining of iron ore at Minerações Brasileiras Reunidas between 1976 and 1983 and was visiting professor at the UNESP (SP) in 1998 and 1999 and at the University of Paris XI (Orsay) in 2008. From 1983 to the present, he has been a professor in the Department of Earth Sciences of the Federal University of Minas Gerais-UFMG, where he teaches structural and iron geology and does research on structural geology, texture, microstructures, and iron ore genesis, mainly in the Quadrilátero Ferrífero and Carajás mineral province. Another field of interest is the influence of textural features in iron ore processing and iron metallurgy (geometallurgy). He also teaches several short courses for graduate programs at the Univ. of Ouro Preto, UWA, and for the iron industry. He was awarded the CVRD Prize by the ABM (Associação Brasileira de Metalurgia e Materiais).

Chris Ryan started his B.Sc. (Hons) in 1974 at Melbourne University and was awarded the Dwight prize for chemistry in 1974. He achieved first class honors and was jointly awarded the Dixon, Kernot, and Tyndall Physics Research Scholarships in 1977. He commenced his Ph.D. thesis in 1979 at University of Melbourne, and completed it in 1984; thesis title, "Measurement of the g-Factors of the High Spin States of 158Er." He is a senior principal research scientist at the CSIRO Exploration and Mining in Melbourne, Victoria, where he leads the Extreme Chemistry and Nuclear Microprobe team.

Carlos Alberto Spier graduated with a degree in geology from the Universidade do Vale do Rio dos Sinos (UNISINOS) in 1983. From 1984 to 1997 he was employed as an exploration, project, and mine geologist in the Amapá State (Amazon region), working with chromium deposits. He studied the genesis of these chromium deposits while earning his M.Sc. degree at the University of Brasilia (UnB), which he completed in 1999. From 1997 to 2003, Carlos worked as a mine and resource geologist at the Águas Claras and Pico iron mines for Minerações Brasileiras Reunidas (MBR). In 2003, he was named manager of the long-term geology department responsible for exploration and resource definition of the iron deposits of MBR. In 2007, after the incorporation of MBR by Vale, he was named a manager and was responsible for the resource evaluation of all iron deposits of Vale in the southern

part of Brazil. He completed his Ph.D. degree at the Universidade de São Paulo (USP), in conjunction with his normal activities for MBR from 2000 to 2005, studying the genesis of banded iron formations and iron ore of the Quadilátero Ferrífero. In July 2007, he was hired by BHP Billiton-Nickel West and assumed the management of the geology department of the Leinster Nickel Operations (Perseverance and Rocky's Reward nickel sulfide mines).

Marius Strydom is a senior resource geologist at Kumba Iron Ore's corporate office in Pretoria, South Africa. He completed his B.Sc (Hons) in geology in 2000 at the University of Pretoria. Afterward he was employed at Kumba Resources in various positions, including mine and production geologist as well as exploration geologist. Since 2006 he has been involved in the resource estimation and evaluation for Kumba Iron Ore.

Victor E. Suckau holds a B.Sc. degree in geology from the Federal University of Rio Grande do Sul, Geoscience Institute, Brazil. He has more than 31 years of experience in exploration, development, and management of drilling programs, geological studies, projects evaluation, and other activities supporting advanced work on uranium, gold, and iron ore projects in Brazil. Since 1998, he has worked for major iron ore companies (Minerações Brasileiras Reunidas, Vale) and has been involved with iron ore mine geology, grade control, mine planning, and regional- and project-scale iron ore exploration projects in the Iron Quadrangle, Minas Gerais State, Brazil. His work includes the identification and evaluation of new exploration targets, scheduling of diamond drilling campaigns, and supervising of construction and maintenance of geologic models to support resource estimation. In addition, he evaluates resources and reserves of mines and iron ore occurrences for acquisition. Currently he is USIMINAS manager for exploration and mine geology.

Warren Thorne has an honors degree and is currently a Ph.D. candidate at the Centre for Exploration Targeting, University of Western Australia. His Ph.D. project, "Structural architecture and fluid geochemistry of high-grade (>63 wt. % Fe) iron ore deposits of the Hamersley Province," is sponsored by an ARC-linkage scholarship between Rio Tinto Exploration and the University of Western Australia. Ongoing research involves defining the fluid geochemistry involved in the transformation of BIF to high-grade iron ore. Warren has worked extensively within the Hamersley province in both exploration and mine geology roles.

Michael Verrall is the electron beam and X-ray diffraction laboratory supervisor at the CSIRO Division of Exploration and Mining. He completed his B.Sc. physics degree at Curtin University in 1992. He then spent about 7 years working for Western Mining Corporation (WMC), initially at Kambalda, where he ran the XRD laboratory and worked on the automation of a scanning electron microscope system for automated liberation analysis on nickel sulfide ores. He commenced work with CSIRO in 1999, helping to develop the AutoGeoSEM, which is used mostly by the mineral sands industry for rapid identification and analysis of exploration and ore samples. He has since taken over the running and management of both the SEM and XRD laboratories. His interests are in providing technical solutions and instrumental improvements to aid in exploration and mining and geologic research.

Adam Webb is currently an exploration geologist for BHP Billiton Iron Ore within the Hamersley province and Brazil. Adam has previously worked as an exploration geologist on iron oxide Cu-Au systems in North Queensland and polymetallic granite-related systems in eastern Australia. Adam completed a doctorate at the University of Queensland in 2003; his dissertation is entitled, "A chemical and mineralogical study of banded iron formation across the Hamersley Province, WA, and how the identified changes related to the formation of the giant high-grade martite-microplaty hematite deposits."

Martin A. Wells is a senior research scientist at the CSIRO Exploration and Mining in Perth, Western Australia. He completed his B.Sc. (Hons) degree in 1987 at the University of Western Australia and received his Ph.D. degree from the same institution in 1998, with thesis study investigating the physical and chemical properties of metal substituted iron oxides. Afterward he accepted a postdoctoral position at the CSIRO Division of Exploration and Mining, examining controls on Ni-Co mineralization at the Murrin Murrin lateritic nickel deposit. Since 2000 his research interests have focused on the characterization of deposit and gangue mineralogy and trace element chemistry of iron ore and lateritic nickel deposits—in particular, trace element associations with iron oxides. In his spare time, he is a keen amateur mineral collector.

Jamie J. Wilkinson was born in the United Kingdom and educated at Cambridge (B.A.) and Southampton (Ph.D.), followed by postdoctoral research at Imperial College London. He is now Reader in hydrothermal geochemistry in the Department of Earth Science Engineering at Imperial College, part of the historic Royal School of Mines, and is a Scientific Associate at the Natural History Museum, London. He has been involved in teaching mineral deposit geology, geochemistry, and field geology in the department for the past 14 years and has supervised 12 Ph.D. students on a range of projects investigating hydrothermal fluid chemistry and ore-forming processes in Chile, Guinea, Ireland, Mexico, Tajikistan, Tanzania, UK, and the United States, in collaboration with a number of mining companies. He was awarded the Max Hey Medal of the Mineralogical Society in 1997, and was the Thayer Lindsley International Travelling Lecturer of the SEG in 2007. Recent keynote and invited conference presentations have centered on active research in the new field of transition metal isotope geochemistry and its application in ore deposit studies and the analysis of ore fluid chemistry. Jamie is currently an associate editor of *Economic Geology* and *Geofluids* and has served on several SEG committees.

Márcia Zucchetti is a senior research geologist at the Geological Survey of Brazil. She graduated in 1983 from the University of Vale do Rio dos Sinos (UNISINOS), Brazil, and received her M.Sc. (1998) and Ph.D. (2007) degrees in economic geology from the Federal University of Minas Gerais, Brazil. Her M.Sc. studies concentrated on the geochemistry of volcanic rocks of the Archean Quadrilátero Ferrífero greenstone belt, whereas her Ph.D. project focused on the geochemistry and hydrothermal alteration of the footwall mafic rocks that surround the iron ore deposits at Carajás. She spent a study year at the University of Western Australia with brief stints at the University of Tasmania (CODES), University of Lausanne, and University of Leeds, conducting a variety of geochemical analyses. Zucchetti joined the Geological Survey in 1987, after working as a mine geologist at a cassiterite mine. She is part of a support team that conducts geologic mapping and microanalytic work. She has published widely in journals such as *Ore Geology Reviews, Mineralium Deposita, and Precambrian Research.* Her scientific interests are in the fields of geochemistry, hydrothermal alteration, and mineral deposits genesis.