



Operations Research Society of South Africa



Category IV Recognition Award

(To an upcoming member of ORSSA
of age 35 or below for excellence
in operations research practice)

Evert Barend Schlünz

Citation. *By Jan van Vuuren, on behalf of the Executive Committee of ORSSA.*

Evert Barend Schlünz was born on April 12th, 1987. After matriculating from Garsfontein High School with an aggregate of 106% in 2005, being named *dux litterarum* and being awarded academic colours by his almamater, he enrolled for a bachelor's degree in the mathematical sciences at Stellenbosch University in 2006, majoring in applied mathematics and operations research. Upon being awarded this degree *cum laude* in 2008, he went on to obtain an honours degree in applied mathematics, again *cum laude* and from the same institution, in 2009. The following year he enrolled for a master's degree in operations research, also at Stellenbosch University. He obtained this master's degree *cum laude* in 2011, based on a thesis entitled *Decision support for generator maintenance scheduling in the energy sector*. During his fulltime studies, Bernard placed within the top three students of the entire Faculty of Science at Stellenbosch University, and hence was twice awarded the Rector's Award for Excellent Academic Achievement — in 2010 and again in 2012. Thereafter, he was employed at Pelindaba by the *Nuclear Energy Corporation of South Africa*, or Necsa. In 2013, however, he enrolled for part time doctoral studies in operations research at Stellenbosch University, while remaining in the employ of Necsa. He is currently in the process of finalising his doctoral dissertation titled *Multiobjective in-core fuel management optimisation for nuclear research reactors*.

Shortly after joining Necsa as a graduate in training in 2012, Bernard was appointed permanently as scientist in 2013 and promoted to senior scientist last year. He is well-known in the local operations research community, and regularly attends ORSSA conferences where he presents his work. In 2011, he won the prize for the best presentation by a masters student at the 40th ORSSA annual conference at Victoria Falls.

At Necsa, Bernard has been responsible for the design of a decision support system for nuclear scientists and engineers in respect of loading configurations for uranium fuel cells into the core of the SAFARI-I nuclear reactor situated at Pelindaba, which is used for research purposes and to irradiate medical isotopes. He has succeeded in modelling this difficult problem as a tetra-objective combinatorial optimisation problem (in which the objective functions and constraints cannot be specified in closed form, but are instead evaluated by a computationally expensive simulator). Since the problem cannot be solved exactly, he has over the last four years designed a suite of metaheuristics, as well as a hyperheuristic, capable of returning high-quality trade-off solutions to this notoriously difficult fuel assembly reloading problem. The fuel reload configurations recommended by his decision support system are better in all objectives than manual solutions determined by experienced nuclear scientists and engineers. He is now involved in the process of integrating these metaheuristic and hyperheuristic solution methodologies into the control systems of the nuclear reactor, after which fuel assembly reload decisions at Necsa will be based on recommendations by his decision support system rather than having to depend on manual, heuristic solutions based on experience.

In recognition of this outstanding operational research work, which is a shining OR success story and a clear example of excellence in OR practice, Evert Barend Schlünz is, on this 13th day of September 2016, duly awarded a Category IV ORSSA Recognition Award. I call on the President to confer the award.