

# Dr. S. L. Bonnet

# Curriculum vitae

## Education

<b>1983-1985</b>	B. Sc. (Chemistry, Mathematics) Bloemfontein, South Africa	University of the Free State,
<b>1986</b>	B. Sc. Honours (Chemistry) Bloemfontein, South Africa	University of the Free State,
<b>1987-1988</b>	M. Sc. (Organic Chemistry, with distinction) State, Bloemfontein, South Africa	University of the Free State,
<b>1989-1993</b>	Ph. D (Organic Chemistry) Bloemfontein, South Africa	University of the Free State,

## Professional Experience

<b>Faculty Officer</b>	1987/01-1988/12	University of the Free State	Bloemfontein
<b>Research assistant</b>	1989/01-1991/09	University of the Free State	Bloemfontein

Move to Welkom at the end of 1991. Return to academic pursuits after raising three children.

<b>Facilitator</b>	2000/01-2002/12	University of the Free State campus, South Africa	Welkom satellite
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<b>Researcher</b>	2004/07-2006/07	University of the Free State South Africa	Bloemfontein,
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<b>Lecturer</b>	2005/08-2009/01	University of the Free State South Africa	Bloemfontein,
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<b>Senior Lecturer</b>	2009/02 - present	University of the Free State South Africa	Bloemfontein,
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**Research visits** 2006/ 11-12. I visited the laboratories of Prof. D. Ferreira, Chair of Pharmacognosy, University of Mississippi, Oxford, Mississippi, USA during November/December of 2006.

2010/06-07. I visited Prof David Reid at the Solid State NMR division of the Chemistry Department at Cambridge University during June/July of 2010. We investigated the use of <sup>13</sup>C SS NMR in the identification and fingerprinting of

synthesized flavonoid dimers, trimers and oligomers, and tannin extracts and the application thereof to the leather industry. The research project led to a publication in *Molecules* published in January 2011.

12/2013 - 02/2014. I visited the laboratories of Prof. L. Skaltsounis, National and Kapodistrian University of Athens, Greece during December 2013 – February 2014 as part of the European Framework 7 program (MUTHI: Multi-disciplinary University Traditional Health Initiative (MUTHI): Building Sustainable Research Capacity on Plants for Better Public Health in Africa).

### **Areas of Expertise**

- Synthetic Organic Chemistry
- Flavonoid Chemistry
- Ethnopharmacology and natural products
- Structure elucidation – especially NMR spectroscopy.

### **Courses Presented**

- Lectures on all facets of organic chemistry including stereochemistry, asymmetric synthesis and radical chemistry at under- and post-graduate levels.
- Supervisor for 1 Post-doc, 2 PhD and 1 MSc students, and co-supervisor for 1 PhD and 1 MSc student.
- Supervisor degrees completed: 1 MSc and 1 PhD student
- Co-supervisor degrees completed: 4 MSc degrees, and 5 PhD degrees.

### **Research**

Current:

- Principal investigator on the wattle extract projects (SS NMR and ESI MS Investigations into the heartwood extracts and sulfited extracts of quebracho and black wattle).
- Principal investigator on the ethnopharmacological investigation of South African plant species with specific reference to their inhibition of the GABA(A) channel (Central Nervous System disorders) in collaboration with the University of Vienna (Prof. S Hering) and the University of Basel (Prof. M Hamburger).
- Principal investigator on the synthesis of sulfited flavan-3-ols, solid state NMR investigation of spent bark liquors, sulfomethylation and Mannich reactions of wattle bark extracts.
- Co-investigator on a zebrafish bio-assay project for toxicity and bioactivity tests of plant extracts.

Previously:

- Principal investigator on the syntheses of benzofuranones, isoaurones, acrylic acids and  $\beta$ -amino acids.
- Co-investigator on the syntheses of aminoalkyl derivatives of chalcones.
- Co-investigator on the syntheses of bioflavonoids.
- Co-investigator on the syntheses of aspalathin.

## **Publications**

1. Jerald J. Nair, Johannes van Staden, Susanna L. Bonnet, Anke Wilhelm. Distribution and Diversity of Usage of the Amaryllidaceae in the Traditional Remediation of Infectious Diseases. *Nat. Prod. Commun.* **2017**, 12(4), 635 – 639.
2. Kinyok, M. J.; Bonnet, S. L.; Notéb, O. P.; Mbing, J. N.; Kamto, E. L.; van der Westhuizen, J. H.; Pegnyem, D. E. A new flavanolignan and a new alkane from the stem bark of *Newtonia griffoniana*. *Nat Prod Res.* **2017**, 13, 1-6. DOI: 10.1080/14786419.2017.1299725
3. Wilhelm, A.; Kendrekar, P.; Noreljaleel, A. E. M.; Abay, E. T.; Bonnet, S. L.; Wiesner, L.; De Kock, C.; Swart, K.; Van der Westhuizen, J. H. Syntheses and in vitro antiplasmodial activity of aminoalkylated chalcones and analogues. *J. Nat. Prod.* **2015**, 78 (8), 1848–1858. DOI: 10.1021/acs.jnatprod.5b00114
4. Bonnet, S. L., Wilhelm, A., Willcox, M., Phungula, K. V. Retrospective treatment outcome analysis on the use of medicinal plants to alleviate diarrhoea in the Thaba Nchu area of the Free State Province, South Africa. *Planta Med.* **2015**, 81 - PW\_99. DOI: DOI: 10.1055/s-0035-1565723
5. Kun Du, Andrew Marston, Sandy F. van Vuuren, Robyn L. van Zyl, Christina Coleman, Pieter C. Zietsman, Susan L. Bonnet, Daneel Ferreira, Jan H. van der Westhuizen. Flavonolacetyl glucosides from the aril of *Schotia brachypetala* Sond. and their antioxidant, antibacterial and antimalarial activities. *Phytochem. Lett.*, **2014**, 10, cxxiii-cxxviii . DOI: 10.1016/j.phytol.2014.05.010
6. Ze Han, Matthew C. Achilonu, Pravin S. Kendrekar, Elizabeth Joubert, Daneel Ferreira, Susan L. Bonnet, Jan H. van der Westhuizen. Concise and Scalable Synthesis of Aspalathin, a Powerful Plasma Sugar-Lowering Natural Product. *J. Nat. Prod.*, **2014**, 77 (3), 583–588. DOI: 10.1021/np4008443
7. Malherbe, C. J.; Willenburg, E.; de Beer, D; Bonnet, S. L.; van der Westhuizen, J. H.; Joubert, E. Iriflophenone-3-C-glucoside from *Cyclopia genistoides*: Isolation and quantitative comparison of antioxidant capacity with mangiferin and isomangiferin using on-line HPLC antioxidant assays. *J. Chrom. B.* **2014**, 951-952, 164-171. DOI: 10.1016/j.jchromb.2014.01.038
8. Phungula, K. V., Marston, A., van Vuuren, S. F., Zietsman, P.C., Bonnet, S.L., van der Westhuizen, J. H. Antioxidant, acetylcholinesterase inhibition and antimicrobial activities of the dichloromethane extracts from the aerial parts of *Galenia africana* L. *Planta Med.* **2014**; 80. DOI: 10.1055/s-0034-1395114
9. Phungula, K. V., Marston, A., van Vuuren, S. F., Zietsman, P.C., Bonnet, S.L. Ethnobotanical survey of plants used for the treatment of tuberculosis by traditional health healers in the Free State Province, South Africa. *Planta Med.* **2014**; 80. DOI: 10.1055/s-0034-1395111

10. Reid, D. G.; Bonnet, S. L.; Kemp, G.; Van der Westhuizen, J. H. Analysis of commercial proanthocyanidins. Part 4: Solid state  $^{13}\text{C}$  NMR as a tool for *in situ* analysis of proanthocyanidin tannins, in heartwood and bark of quebracho and acacia, and related species. *Phytochemistry*. **2013**, *94*, 243-248. DOI: 10.1016/j.phytochem.2013.06.007
11. Joubert, E.; de Beer, D.; Malherbe, C. J.; Muller, N.; Bonnet, S. L., van der Westhuizen, J. H., Ferreira, D. Occurrence and sensory perception of Z-2-( $\beta$ -D-glucopyranosyloxy)-3-phenylpropenoic acid in rooibos (*Aspalathus linearis*). *Food Chem.* **2013**, *136*, 1078-1085.
12. Venter, P. B.; Senekal, N. D.; Kemp, G.; Amra-Jordaan, M; Pir Khan, Bonnet, S. L.; Van der Westhuizen, J. H. Analysis of commercial proanthocyanidins. Part 3: The chemical composition of wattle (*Acacia mearnsii*) bark extract. *Phytochemistry*, **2012**, *83*, 153-167.
13. Venter, P. B.; Senekal, N. D.; Amra-Jordaan, M.; Bonnet, S. L.; Van der Westhuizen J. H. Analysis of Commercial Proanthocyanidins. Part 2: An Electrospray Mass Spectrometry Investigation into the Chemical Composition of Sulfited Quebracho (*Schinopsis lorentzii* and *Schinopsis balansae*) Heartwood Extract, *Phytochemistry*, **2012**, *78*, 156-169.
14. Wilhelm-Mouton, A.; Bonnet, S. L.; Ding, Y.; Li, X-C.; Ferreira, D.; van der Westhuizen, J. H. Photochemistry synthesis. Part 2: Enantiomerically pure polyhydroxy-1,1,3-triarylpropan-2-ols, *J. Photochem. Photobiol. A: Chemistry*, **2012**, *227*, 18-24.
15. Venter, P. B.; Sisa, M.; van der Merwe, M. J.; Bonnet, S. L.; van der Westhuizen, J. H. Analysis of Commercial Proanthocyanidins. Part 1: The Chemical Composition of Quebracho (*Schinopsis lorentzii* and *Schinopsis balansae*) Heartwood Extract, *Phytochemistry*, **2012**, *73*, 95-106.
16. Romer, H. R.; Underwood, P.; Senekal, N. D.; Bonnet, S. L.; Duer M. J.; Reid, D. G.; Van der Westhuizen, J. H. Tannin Fingerprinting in Vegetable Tanned Leather by Solid State NMR Spectroscopy and Comparison with Leathers Tanned by Other Processes, *Molecules*, **2011**, *16*, 1240-1252.
17. Sisa, M.; Bonnet, S.L.; Ferreira, D.; Van der Westhuizen, J.H. Photochemistry of flavonoids. *Molecules* **2010**, *15*, 5196-5245.
18. Mweta, D.E.; Labuschagne, M.T.; Bonnet, S.L.; Swarts, J.; Saka, J.D.K. Isolation and physicochemical characterization of starch from cocoyam (*Colocasia esculenta*) grown in Malawi. *J Sci Food Agric*, **2010**; *90*, 1886–1896.
19. Achilonu, M.C.; Bonnet, S.L.; Van der Westhuizen, J.H. Synthesis of Proanthocyanidins Part 1. The First Oxidative Formation of the Interflavanyl Bond in Procyanidins. *J. Org. Lett.*, **2008**, *10* (17), 3865–3868.
20. Osthoff, G.; Dickens, L.; Urashima, T.; Bonnet, S.L.; Uemura, Y.; Van der Westhuizen, J.H. Structural characterization of oligosaccharides in the milk of an African elephant (*Loxodonta africana africana*). *Comp Biochem Physiol B Biochem Mol Biol.*, **2008**, *150*(1), 74-84.
21. Han, Z.; Bonnet; S.L.; Van der Westhuizen J.H. Photochemistry synthesis. Part 1: Syntheses of xanthine derivatives by photolysis of 1-(5'-oxohexyl)-3,7-dimethyl-3,7-dihydro-1H-purine-2,6-dione (pentoxifylline): an ambident chromophore. *Tetrahedron*, **2008**, *64*, 2619-2625.
22. Bonnet; S.L.; Steynberg; J.P.; Bezuidenhoudt; B.C.B.; Saunders; C.M.; Ferreira, D. Structure and synthesis of phlobatannins related to bis-fisetinidol-epicatechin profisetinidin triflavanoids. *Phytochemistry*, **1996**, *43*(1), 253-263.
23. Bonnet; S.L.; Steynberg; J.P.; Bezuidenhoudt; B.C.B.; Saunders; C.M.; Ferreira, D. Structure and synthesis of phlobatannins related to the (4 $\alpha$ ,6:4 $\beta$ ,8)-bis-fisetinidol-catechin profisetinidin triflavanoid. *Phytochemistry*, **1996**, *43*(1), 241-251.

24. Bonnet; S.L.; Steynberg; J.P.; Bezuidenhoudt; B.C.B.; Saunders; C.M.; Ferreira, D. Structure and synthesis of phlobatannins related to the (4 $\beta$ ,6:4 $\alpha$ ,8)-bis-fisetinidol-catechin profisetinidin triflavanoid. *Phytochemistry*, **1996**, 43(1), 229-240.
25. Bonnet; S.L.; Steynberg; J.P.; Bezuidenhoudt; B.C.B.; Saunders; C.M.; Ferreira, D. Structure and synthesis of phlobatannins related to the (4 $\alpha$ ,6:4 $\beta$ ,8)-bis-fisetinidol-catechin profisetinidin triflavanoid. *Phytochemistry*, **1996**, 43(1), 215-228.
26. Saunders, C.M.; Bonnet; S.L. Steynberg, J.P.; Ferreira, D. Oligomeric flavanoids. Part 24. Controlled biomimetic synthesis of profisetinidin triflavanoid related phlobatannins. *Tetrahedron*, **1996**, 52(16), 6003-6010.
27. Steynberg, J.P.; Burger, J.F.; Cronje, A.; Bonnet, S.L.; Malan, J.C.S.; Young, D.A.; Ferreira, D. Structure and synthesis of phlobatannins related to (-)-fisetinidol-epicatechin profisetinidins. *Phytochemistry*, **1990**, Vol. 29(9), 2979-2989.

## Patents

1. Achilonu, M. C.; Bonnet, L. C.; Van Der Westhuizen, J. H. Method for the Preparation of C-4 Coupled Flavonoids, Proanthocyanidins and Analogues thereof. PCT Application number PCT/IB2009/052396 based on ZA Provisional Patent Application 2008/04953, **June 5, 2009**.
2. Achilonu. M. C.; Bonnet S. L.; Van Der Westhuizen J. H. Synthesis of 3-Aryl Flavenes and C-3 Coupled Biflavonoids. PCT Application number PCT/IB2010/053755 based on ZA Provisional South African Patent Application 2009/05765, **August 19, 2010**.
3. Van Der Westhuizen, J. H.; Noreljaleel, A. E. M.; Bonnet, S. L.; Wilhelm-Mouton, A. Aminoalkyl Substituted Chalcones and Analogues and Derivatives thereof. PCT application number PCT/IB2011/052396, **May 31, 2011** based on South African Provisional Patent Application No: 2010/03897 **May 31, 2010**.
4. Van Der Westhuizen, J. H.; Ferreira, D. Joubert, E.; Bonnet, S. L. Synthesis of Aspalathin and Analogues thereof. PCT Application number WO2011/064726 A1, June 3, 2011 (based on ZA Provisional Patent Applications 2009/08304, 2009/08308 and 2009/08309, **November 24, 2010**).
5. Van der Westhuizen, J. H.; Bonnet, S. L.; Davis, H. J. Method for the Formation and Analysis of Sulfited Tetrameric, Trimeric, Dimeric and Monomeric Compounds from Commercial Proanthocyanidins. South African Patent Application: 2012/02487, **April, 2012**.

## Conferences (last 5 years)

SACI – ACS Bi-national Organic Chemistry Conference 2016, Stellenbosch, South Africa, 30 November – 4 December 2016. Lecture: S. L. Bonnet. Analysis of commercial proanthocyanidins. Investigation into the sulfitation of wattle (*Acacia mearnsii*) bark extract.

Bruker Conference, Cape Town, South Africa, 27 – 29 January 2016. Oral Presentation: Anwar E. Norjaleel, Susan L. Bonnet, and Jan H. van der Westhuizen. Sulfitation of flavan-3-ols.

63<sup>st</sup> International Congress and Annual Meeting of the Society for Medicinal Plant and Natural Product Research (GA) 2015, Budapest, Hungary, 23 August – 27 August 2015. Poster: Phungula, K., Willcox, M., Khamane, M., Wilhelm, A. and, Bonnet, S. L. Retrospective treatment outcome analysis on the use of medicinal plants to alleviate diarrhoea in the Thaba ‘Nchu area of the Free State Province, South Africa.

IPUF 2015, Clanwilliam, South Africa, 29 June – 3 July 2015. Poster: Bonnet, S. L., Reid, D.G., Kemp, G. and van der Westhuizen, J.H.  $^{13}\text{C}$  NMR as a tool for in situ tannin typing and estimation in uncharacterized acacia species.

SACI – ACS Bi-national Organic Chemistry Conference 2014, Stellenbosch, South Africa, 30 November – 4 December 2014. Poster: R. M. Montsho, J. H. van der Westhuizen, S. L. Bonnet. The syntheses and bio-activity of  $\alpha$ -aryl- $\beta$ -amino acid esters via the Michael addition of amines to  $\alpha$ -aryl acrylates.

62<sup>st</sup> International Congress and Annual Meeting of the Society for Medicinal Plant and Natural Product Research (GA), University of Minho, Guimarães, Portugal, 31 August – 4 September 2014. Poster: Khanya V. Phungula, Andrew Marston, Sandy F. van Vuuren, Pieter C. Zietsman, Susan L. Bonnet, Jan H. van der Westhuizen. Antioxidant, acetylcholinesterase inhibitory and antimicrobial activities of dichloromethane extracts from the aerial parts of *Galenia africana* L.

61<sup>st</sup> International Congress and Annual Meeting of the Society for Medicinal Plant and Natural Product Research (GA), Münster, Germany, 1 – 5 September 2013. Poster: M. Amra-Jordaan, P.B. Venter, N.D. Senekal, S.L. Bonnet, J.H. van der Westhuizen. *The Chemical Composition of Sulphited Quebracho (Schinopsis lorentzii and Schinopsis balansia) Heartwood Extract.*

ASMC'13 Moscow: 5th International Symposium on Advances in Synthetic and Medicinal Chemistry, Moscow, Russia, 5-8 May, 2013.

13<sup>th</sup> Belgian Organic Synthesis Symposium (BOSS)/ XIII), Leuven, Belgium, 15 – 20 July 2012. Poster: Anke Wilhelm-Mouton, Susan L. Bonnet, Yuanqing Ding, Xing-Cong Li, Daneel Ferreira, and Jan H. van der Westhuizen. *Photochemistry of Catechin and Epicatechin II.*

12<sup>th</sup> Frank Warren Conference of the South African Chemical Institute, Bloemfontein, South Africa, 15 – 18 April, 2012.

I was a member of the committee that organized the highly successful Frank Warren Conference on Organic Chemistry that was held in Bloemfontein from 15 – 18 April, 2012.

## **OTHER PROFESSIONAL ACTIVITIES**

1. Reviewer for peer-reviewed chemistry journals including the *South African Journal of Chemistry*, *Phytochemistry*, *Journal of Natural Products* and *Phytochemistry Letters*.
2. I have served as external assessor for PhD and MSc dissertations and theses from The University of KwaZulu-Natal, University of South Africa and Rhodes University.
3. I have served as a panel member and as postal peer reviewer for NRF funding and rating application assessment panels.

4. I was part of the organizing committee for the 2012 Frank Warren Organic Chemistry Conference.