

UNIVERSITY OF PRETORIA
FORMAT OF CURRICULUM VITAE

1. BIOGRAPHICAL SKETCH

1.1 GENERAL INFORMATION

Surname	Krüger									
First names	Tjaart Petrus Jakobus			ID Number	8304155053083					
Citizenship	South African			Title	Prof.	Female	<input type="checkbox"/>	Male	<input checked="" type="checkbox"/>	
Place of birth	Alberton, South Africa			Date of birth	15 April 1983					
Population group	African	<input type="checkbox"/>	Coloured	<input type="checkbox"/>	Indian	<input type="checkbox"/>	White	<input checked="" type="checkbox"/>	Other (Please specify)	<input type="checkbox"/>
Department	Physics			Position	Associate Professor					
Direct Telephone	012 420 2508			Direct Telefax	012-362-5288					
E-mail	tjaart.kruger@up.ac.za									
Date of appointment	1 March 2013			Permanent full-time	<input checked="" type="checkbox"/>	Temporary full-time	<input type="checkbox"/>			

1.2 ACADEMIC QUALIFICATIONS OBTAINED

Degree/ Diploma	Field of study	Higher education institution	Year	Distinctions
BSc	Physics, Mathematics, and Applied Mathematics	Potchefstroom University for CHE	2003	All subjects
MSc	Physics	Northwest University (Potchefstroom Campus)	2005	Yes
PhD	Biophysics	Vrije Universiteit Amsterdam	2011	Yes

1.3 WORK EXPERIENCE TO DATE

Name of employer	Capacity and/or type of work	Period From mm//yy to mm//yy
Northwest University (Potchefstroom Campus)	Research Assistant	01//06 – 03//06
Vrije Universiteit Amsterdam	Postdoctoral Fellowship	10//10 – 02//13
University of Pretoria	Senior Lecturer	03//13 – 12//17

University of Pretoria	Associate Professor	01//18 – current
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2. TEACHING ACTIVITIES

2.1 Courses presented		
Course	Level (e.g. second year, Masters)	Self developed (Yes or No)
PHY 263: Physical Optics	Second year	Partially
PHY 255: Thermodynamics	Second year	Partially
FSK 808: Physics in Anaesthesiology	Masters	Partially
FSK 700: Photonics and Lasers	BSc. Hons.	Yes
FSK 700: Biophysics	BSc. Hons	Yes
FSK 700: Solar Energy and Photosynthesis	BSc. Hons	Yes

2.2 Other education and pedagogic courses presented		
Course	Year	Institution
Single molecule spectroscopy (part of MSc course “Current Developments in Biophysics”)	2010	Vrije Universiteit Amsterdam

2.3 Schools organised		
Name	Year	Institution
Biophysics Winter School	2013	University of Zululand
Biophysics Winter School	2016	University of Cape Town
Solar Energy and Photosynthesis School	2017-2019	University of Pretoria

3 TEACHING OUTPUTS

3.1 Educational publications and products

Editor of the “World of Biophysics” educational booklet, SO Productions, South Africa, 2015

(<http://www.up.ac.za/media/shared/107/Research/Biophysics/saip-biophysics-brochure.zp79597.pdf>).

5 POSTGRADUATE SUPERVISION

5.1 Former supervision or co-supervision of BSc (Hons) students (completed)				
Name of student	Degree/Title of dissertation/thesis and date	Supervisor	Co-supervisor(s)	Duration of studies (years)
Ashton V Dingle	BSc Hons (<i>cum laude</i>) "Determining the Energy Pathways in Light Harvesting Complex II using Femtosecond Laser Techniques at Two Excitation Wavelengths" Dec. 2014	Tjaart Krüger	Jennifer Williams (Rhodes University)	1
A Justin Harrison	BSc Hons (<i>cum laude</i>) "Ultrafast Laser Pulse Shaping" Jan. 2017	Tjaart Krüger		1
Bertus van Heerden	BSc. Hons. (<i>cum laude</i>) "Investigation of Fluorescence Intensity and Lifetime Dynamics of Single LHCII Complexes" Jan. 2019	Tjaart Krüger		1
Carrie-Anne Rubidge	BSc Hons (<i>cum laude</i>) "Coherent control in light-harvesting complex II" Jan. 2019	Tjaart Krüger	Huzifa Elnour	1
Marissa Boshoff	BSc Hons (<i>cum laude</i>) "A comparative study of plasmonic-enhanced fluorescence of the main plant light-harvesting complex induced by gold nanostructures" Jan. 2019	Tjaart Krüger	Farooq Kyeyune	1
Johanette Staats	BSc Hons "Intensity dynamics of single light-harvesting complexes from cryptophyte algae" Jan. 2019	Tjaart Krüger	Michal Gwizdala	1
Sifiso Mpapane	BSc Hons "Calculating and measuring the size and other properties of apertured laser beams" Jan. 2019	Tjaart Krüger	Cosmas Mafusire	1

5.2 Former supervision or co-supervision of MSc, PhD and postdoctoral students (completed)				
Name of student	Degree/Title of dissertation/thesis and date	Supervisor	Co-supervisor(s)	Duration of studies (years)
JA (Towan) Nöthling	MSc (<i>cum laude</i>) "Exciton dynamics in photosynthetic molecular aggregates" April 2016	Tjaart Krüger	Tomas Mancal (Charles University Prague)	2

Joshua L Botha	MSc (<i>cum laude</i>) "Using single molecule spectroscopy to study fast photoprotective processes in plants" November 2016	Tjaart Krüger	Mmantsae Diale and Rienk van Grondelle (Vrije Universiteit Amsterdam)	3
Asmita Singh	MSc "Illuminating the ultrafast excited state dynamics of protein-bound carotenoids in plants" April 2017	Tjaart Krüger		3
A Justin Harrison	MSc (<i>cum laude</i>) "Investigating electron-transfer processes of supramolecular donor-acceptor complexes using femtosecond transient absorption spectroscopy" February 2019	Tjaart Krüger	Shankara Radhakrishnan (UP Dept. Chemistry)	2
J Michael Gruber	PhD "From Picoseconds to Seconds: Fluorescence Dynamics of Single Light-Harvesting Complexes" December 2016	Rienk van Grondelle (Vrije Universiteit Amsterdam)	Tjaart Krüger	5
Huzifa MAM Elnour	PhD "Spectroscopy and control of ultrafast energy dynamics in natural light-harvesting complexes" Dec. 2018	Tjaart Krüger	Rienk van Grondelle (Vrije Universiteit Amsterdam)	5
Alexander T Paradzah	PhD "Investigation of energy transfer in light harvesting complexes and hybrid structures" Feb. 2019	Tjaart Krüger	Mmantsae Diale	5

5.3 Current post-graduate students					
Name of student	Degree enrolled for and date of first registration	Project title	Supervisor	Co-supervisor(s)	Year of registration
Stephen Brookes	BSc. Hons. Jan. 2018	Implementation of real-time auto-refocussing into a confocal microscope	Tjaart Krüger	Farooq Kyeyune	2
Johann Smith	BSc. Hons. Jan. 2019	Investigating fluorescence blinking in chlorophyll <i>a</i>	Tjaart Krüger	Joshua Botha	1
Antoinette L Lottering	MSc Jun. 2017	Synthesis, redox and photophysical properties of triarylamine-thienyl Fischer carbene complexes	Daniela Bezuidenhout (WITS Dept. Chemistry)	Tjaart Krüger	3
Sipho Congolo	MSc Feb. 2017	A study of transparent hematite films using ultrafast	Mmantsae Diale	Tjaart Krüger	3

		spectroscopy			
Abrie J Cronje	MSc Feb. 2017	Synthesis and characterization of transparent conducting oxides for Stark effect applications in single molecule spectroscopy	Mmantsae Diale	Tjaart Krüger	3
Bertus van Heerden	MSc Feb. 2019	Using single-particle tracking to investigate the main plant light-harvesting complex	Tjaart Krüger		1
Carrie-Anne Rubidge	MSc Jan. 2019	Controlling photoprotection in plants with shaped light	Tjaart Krüger		1
Natasha SC Barton	MSc Jan. 2019	Ultrafast pump-probe spectroscopy on a bioinspired light harvesting donor-acceptor assembly	Tjaart Krüger	Shankara Radhakrishnan (UP Dept. Chemistry)	1
Sifiso S Mpapane	MSc Jan. 2019	Phase retrieval from light beam intensity measurements	Tjaart Krüger	Cosmas Mafusire	1
Sandile Thubane	MSc Jan. 2019	Optimization of dye-sensitized solar cells using natural pigments	Mmantsae Diale	Tjaart Krüger	1
Mmathapelo Sebidi	MSc Jan. 2019	Biohybrid solar cell structure based on a hematite-cyanobacteria hybrid system	Mmantsae Diale	Tjaart Krüger	1
Farooq Kyeyune	PhD Jun. 2015	Development of single molecule spectroscopic techniques to investigate photoprotection in plants	Tjaart Krüger	Mmantsae Diale	5
JA (Towan) Nöthling	PhD Apr 2016	Excitation dynamics and quenching in photosynthetic light-harvesting over all time-scales	Tjaart Krüger	Tomas Mancal (Charles University Prague)	4
Joshua L Botha	PhD Feb. 2017	Investigating functional dynamics in individual light-harvesting complexes in realistic environments	Tjaart Krüger	Rienk van Grondelle (Vrije Universiteit Amsterdam)	3
Tesfaye A Gonfa	PhD Jun. 2018	Investigation into the photoprotection mechanisms of cyanobacteria	Tjaart Krüger	Michal Gwizdala	2
Luke Ugwuoke	PhD	Modelling exciton-	Tjaart Krüger	Tomas Mancal	2

	Jul. 2018	plasmon interactions in photosynthetic light harvesting complexes		(Charles University Prague)	
Justine Nyarige	PhD Jun. 2018	Ultrafast spectroscopic studies of L-arginine grown on hematite nanostructures prepared by spray pyrolysis	Mmantsae Diale	Tjaart Krüger	2
Cosmas Mafusire	Postdoctoral fellowship Sept. 2015	Analysis of the propagation of aberrated laser beams using phase-space optics theory	Tjaart Krüger		2
Michal S Gwizdala	Postdoctoral fellowship Apr 2016	Revealing design principles for light harvesting regulation in photosynthesis to create a blueprint for maquette-based artificial photosynthesis	Tjaart Krüger		2

7 RESEARCH OUTPUTS

7.1 Publications in peer-reviewed or refereed journals

1. R. A. Burger, **T. P. J. Krüger**, M. Hitge, N. E. Engelbrecht, "A Fisk-Parker Hybrid Heliospheric Magnetic Field with A Solar-Cycle Dependence." *Astrophys J* **674**:511–519 (2008).
2. **T. P. J. Krüger**, V. I. Novoderezhkin, C. Iliaia, R. van Grondelle, "Fluorescence Spectral Dynamics of Single LHCII Trimers." *Biophys J*, **98**:3093–3101 (2010).
3. **T. P. J. Krüger**, C. Iliaia, R. van Grondelle, "Fluorescence Intermittency from the Main Plant Light-Harvesting Complex: Resolving Shifts between Intensity Levels." *J Phys Chem B* **115**:5071–5082 (2011).
4. **T. P. J. Krüger**, C. Iliaia, L. Valkunas, R. van Grondelle, "Fluorescence Intermittency from the Main Plant Light-Harvesting Complex: Sensitivity to the Local Environment." *J Phys Chem B* **115**:5083–5095 (2011).
5. **T. P. J. Krüger**, E. Wientjes, R. Croce, R. van Grondelle, "Conformational Switching Explains the Intrinsic Multifunctionality of Plant Light-Harvesting Complexes." *Proc Natl Acad Sci USA*, **108**:13516-13521 (2011).
6. **T. P. J. Krüger**, C. Iliaia, M. P. Johnson, A. V. Ruban, E. Papagiannakis, P. Horton, R. van Grondelle, "Controlled Disorder in Plant Light-Harvesting Complex II Explains its Photoprotective Role." *Biophys J* **102**: 2669–2676 (2012).
7. L. Valkunas, J. Chmeliov, **T. P. J. Krüger**, C. Iliaia, R. van Grondelle, "How Photosynthetic Proteins Switch." *J Phys Chem Lett* **3**:2779–2784 (2012).
8. **T. P. J. Krüger**, C. Iliaia, M. P. Johnson, E. Belgio, P. Horton, A. V. Ruban, R. van Grondelle, "The Specificity of Controlled Protein Disorder in the Photoprotection of Plants" *Biophys J* **105**:1018–1026 (2013). *Selected for editor's choice*
9. J. Chmeliov, L. Valkunas, **T. P. J. Krüger**, C. Iliaia, R. van Grondelle, "Fluorescence Blinking of Single Major Light-Harvesting Complexes." *New J Phys* **15**:085007 (2013).
10. D. C. Onwudiwe, **T. P. J. Krüger**, O. S. Oluwatobi, C. A. Strydom, "Nanosecond Laser Irradiation Synthesis of CdS Nanoparticles in a PVA System", *Appl Surface Sci* **290**:18-26 (2014).
11. D. C. Onwudiwe, **T. P. J. Krüger**, C. A. Strydom, Laser Assisted Solid State Reaction for the Synthesis of ZnS and CdS Nanoparticles from Metal Xanthate, *Mater Lett* **116**, 154-159 (2014).
12. L. Sitole, F. Steffens, **T. P. J. Krüger**, D. Meyer, "Mid-ATR-FTIR Spectroscopic Profiling of HIV/AIDS Sera for Novel Systems Diagnostics in Global Health." *OMICS: A Journal of Integrative Biology* **18**:1-11 (2014).
13. **T. P. J. Krüger**, C. Iliaia, M. P. Johnson, A. V. Ruban, R. van Grondelle, "Disentangling the Low-Energy States of the Major Light-Harvesting Complex of Plants and their Role in Photoprotection." *Biochim Biophys Acta* **1837**:1027-1038 (2014).
14. D. C. Onwudiwe, **T. P. J. Krüger**, A. Jordaan, C. A. Strydom. "Laser-Assisted Synthesis, Structural, and Thermal Properties of ZnS Nanoparticles Stabilized in Polyvinyl Pyrrolidone", *Appl Surface Sci*, **321**:197-204 (2014).
15. C. Ramanan, J. M. Gruber, P. Maly, M. Negretti, V. I. Novoderezhkin, **T. P. J. Krüger**, T. Mancal, R. Croce, R. van Grondelle, "Site Specific Mutation Elucidates the Role of Exciton Delocalization in the Lowest Energy State Cluster of LHCII Monomer." *Biophys J* **108** (5): 1047-1056 (2015).
16. A. Gall, C. Iliaia, **T.P.J. Krüger**, B. Robert, R. van Grondelle, "Conformational Changes in a Single Light-Harvesting Protein as Followed by Fluorescence Spectroscopy." *Biophys J* **108** (11): 2713-2720 (2015).
17. G. S. Schlau-Cohen, H.-Y. Yang, **T. P. J. Krüger**, P. Xu, M. Gwizdala, R. van Grondelle, R. Croce, W. E. Moerner. "Single-molecule Identification of Quenched and Unquenched States of LHCII." *J Phys Chem Lett* **6**: 860-867 (2015).
18. J.M. Gruber, J. Chmeliov, **T.P.J. Krüger**, L. Valkunas, R. van Grondelle, "Singlet–triplet annihilation in single LHCII complexes." *Phys Chem Chem Phys* **17** (30): 19844-19853 (2015).

19. **T.P.J. Krüger** and R. van Grondelle, "Design principles of natural light-harvesting as revealed by single molecule spectroscopy." *Physica B: Condensed Matter*, 480:7-13 (2016).
20. J.M. Gruber, P. Xu, J. Chmeliov, **T.P.J. Krüger**, M.T.A. Alexandre, L. Valkunas, R. Croce and R. van Grondelle, "Dynamic quenching in single photosystem II Supercomplexes" *Phys Chem Chem Phys* 18: 25852-25860 (2016).
21. M.S. Gwizdala, R. Berera, D. Kirilovsky, R. van Grondelle and **T.P.J. Krüger**, "Controlling light harvesting with light" *J Am Chem Soc* 138 (36): 11616-11622 (2016).
22. C. Mafusire and **T.P.J. Krüger**, "Strehl ratio and amplitude-weighted generalized orthonormal Zernike-based polynomials", *Applied Optics* 56:2336-2345 (2017)
23. **T.P.J. Krüger*** and R. van Grondelle, "The role of energy losses in photosynthetic light harvesting" *J Phys B: At Mol Opt Phys* 50: 132001 (2017) *Invited review
24. **T.P.J. Krüger**, P. Maly, M.T.A. Alexandre, T. Mancal, C. Büchel and R. van Grondelle, "How reduced excitonic coupling enhances light harvesting in the main photosynthetic antennae of diatoms" *Proc Natl Acad Sci USA* 114: E11063-E11071 (2017)
25. A.T. Paradzah, M. Diale, K. Maabong and **T.P.J. Krüger**, "Use of interfacial layers to prolong hole lifetimes in hematite probed by ultrafast transient absorption spectroscopy" *Physica B: Condensed Matter* 535:138-142 (2018)
26. C. Ilioaia, **T.P.J. Krüger**, O. Ilioaia, B. Robert, R. van Grondelle and A. Gall, "Apoprotein heterogeneity increases spectral disorder and a step-wise modification of the B850 fluorescence peak position." *Biochim Biophys Acta – Bioenergetics* 1859:137-144 (2018)
27. J.M. Gruber, P. Maly, **T.P.J. Krüger** and R. van Grondelle, "From isolated light-harvesting complexes to the thylakoid membrane:a single-molecule perspective" *Nanophotonics* 7:81-92 (2018)
28. C. Mafusire and **T.P.J. Krüger**, "Orthonormal vector polynomials in general pupils derived from the Cartesian gradient of the orthonormal Zernike-based polynomials using the Gauss-Jordan elimination method" *J Opt Soc Am A* 35:840-849 (2018)
29. C. Mafusire and **T.P.J. Krüger**, "Local and curvature divergence in first order optics." *J. Opt.* 20:0965603 (2018)
30. M.S. Gwizdala, **T.P.J. Krüger**, Md. Wahadoszamen, J.M. Gruber, D. Kirilovsky and R. van Grondelle, "Phycocyanin: one complex, two states, two functions." *J Phys Chem Lett* 9:1365-1371 (2018)
31. M.S. Gwizdala, J.L. Botha, A. Wilson, D. Kirilovsky, R. van Grondelle and **T.P.J. Krüger**, "Switching an individual phycobilisome off and on." *J Phys Chem Lett* 9:2426-2432 (2018)
32. H.M.A.M. Elnour, C. Ramanan, L. Dietzel, C. Büchel, R. van Grondelle and **T.P.J. Krüger**, "Energy dissipation mechanisms in the FCPb light-harvesting complex of the diatom *Cyclotella meneghiniana*." *Biochim Biophys Acta – Bioenergetics* 1859:1151-1160 (2018)
33. A. Marais, B. Adams, A. Ringsmuth, M. Ferretti, J.M. Gruber, R. Hendrikx, M. Schuld, S.L. Smith, I. Sinayskiy, **T.P.J. Krüger**, F. Petruccione and R. van Grondelle, "The future of quantum biology." *J R Soc Interface* 15: 20180640 (2018)
34. **T.P.J. Krüger**, R. van Grondelle and M.S. Gwizdala, "The role of far-red spectral states in the energy regulation of phycobilisomes." *Biochim. Biophys. Acta – Bioenergetics* 1860:341-349 (2019).
35. A.T. Paradzah, K. Maabong, H.M.A.M. Elnour, A. Singh, M. Diale and **T.P.J. Krüger**, "Identification of exciton-exciton annihilation in hematite thin films." *J Phys Chem C* 123:18676-18684 (2019)
36. F. Keyyune, J.L. Botha, B. van Heerden, P. Maly, R. van Grondelle, M. Diale and **T.P.J. Krüger**. "Strong plasmonic fluorescence enhancement of individual plant light-harvesting complexes." *Nanoscale* 11:15139-15146 (2019)
37. L.C. Ugwuoke, T. Mancal and **T.P.J. Krüger**, "Localized Surface Plasmon Resonances of simple tunable plasmonic nanostructures." *Accepted in Plasmonics* [arXiv preprint 1905.08185 (2019)].

7.2 Manuscripts submitted to peer-reviewed or refereed journals

38. Md. Wahadoszamen*, **T.P.J. Krüger***, A.M Ara, R. van Grondelle, M.S. Gwizdala, "Charge-transfer states in phycobilisomes." *Submitted to Proc Natl Acad Sci USA* (*equal contribution)
39. K. Maabong, A.T. Paradzah, **T.P.J. Krüger**, M. Diale, "Enhanced photoelectrochemical performance in semi-transparent Ti-hematite photoanodes prepared by spin coating." *Submitted to Int. J. Hydrog. Energy*.
40. J.S. Nyarige, **T.P.J. Krüger** and M Diale. "Effects of L-arginine concentration on hematite nanostructures synthesized by spray pyrolysis and chemical bath deposition." *submitted to Physica B*
41. J.S. Nyarige, **T.P.J. Krüger** and M Diale. "Structural and optical properties of hematite and L-arginine/hematite nanostructures prepared by thermal spray pyrolysis." *submitted to Surfaces and Interfaces*

7.3 Books and/or chapters in books

Book Chapters

1. **T. P. J. Krüger**, V. I. Novoderezhkin, E. Romero, R. van Grondelle, "Photosynthetic Energy Transfer and Charge Separation in Higher Plants", *In: "The Biophysics of Photosynthesis"*, Vol 11, pp. 79-118, J. Golbeck and A. van der Est (Eds.); (Series: "Biophysics for the Life Sciences"), Springer, Dordrecht, (2014).
2. **T. P. J. Krüger**, C. Illoaia, M. Alexandre, P. Horton, and R. van Grondelle, "How Protein Disorder Controls NPQ", *In: "Non-Photochemical Quenching and Energy Dissipation in Plants, Algae and Cyanobacteria"*, B. Demmig-Adams, G. Garab, W. Adams III, and Govindjee (Eds.) ("Advances in Photosynthesis and Respiration"; Series Editors: Govindjee and T. D. Sharkey), Springer, Dordrecht (2014).

Books

1. E. Roduner, **T.P.J. Krüger**, P.B.C. Forbes, K. Kreß, "Optical Spectroscopy – Fundamentals and Advanced Applications" *World Scientific Publishing Europe Ltd* (2018).

7.4 Published full-length conference papers/keynote addresses

1. C. Illoaia, **T. P. J. Krüger**, M. P. Johnson, P. Horton, A. V. Ruban, and R. van Grondelle, *Eur Biophys J*, **40**:176-177 (2011).
2. H.Y. Yang, G.S. Schlau-Cohen, M. Gwizdala, **T.P.J. Krüger**, P. Xu, R. Croce, R. van Grondelle and W.E. Moerner, *SPIE BiOS*, 933109-933109-5 (2015).
3. J.A. Nöthling, **T.P.J. Krüger**, T. Mancal, in *The Proceedings of the 60th Annual Conference of the South African Institute of Physics (SAIP2015)*, edited by Makaiko Chithambo (RU) and André Venter (NMMU) (2015), pp. 527 - 531. ISBN: 978-0-620-70714-5 (2016).
4. A. Singh, **T.P.J. Krüger**, "Investigating the excited electronic states of carotenoids in the main plant light-harvesting complex (LHCII) via femtosecond pump-probe spectroscopy" *South African Journal for Science and Technology* 35(1), a1417 (2016).
5. P. Mredlana, D. Naidoo, C. Mafusire, A. Dudley, **T.P.J. Krüger**, Andrew Forbes, "Unveiling the radial modes in vortex beams", *Proc. SPIE* 10090 (2017).
6. A. Singh, **T.P.J. Krüger**, "Applying the technique of ultrafast pump-probe spectroscopy on the main plant light-harvesting complex of spinach leaves." in *The Proceedings of the 61st Annual Conference of the South African Institute of Physics (SAIP2016)*, edited by Steve Peterson and Sahal Yacoob (UCT/2016), pp. 188 – 193, ISBN: 978-0-620-77094-1 (2017).

7.5 Non-refereed publications or popular articles

- T.P.J. Krüger, M.S. Gwizdala, "A smart 'switch' in photosynthesis holds lessons for solar technology", *The Conversation Africa*, 28 Nov. 2016. (<https://theconversation.com/a-smart-switch-in-photosynthesis-holds-lessons-for-solar-technology-66602>)
- T.P.J. Krüger, "Water-dwelling organisms show new ways to harvest light for solar tech" *The Conversation Africa*, 18 Dec. 2017. (<https://theconversation.com/water-dwelling-organisms-show-new-ways-to-harvest-light-for-solar-tech-88801>)
- T.P.J. Krüger, LS Norris, BT Sewell, "South Africa needs more investment in biophysics and structural biology", *Daily Maverick*, 4 April 2018. (<https://www.dailymaverick.co.za/article/2018-04-04-op-ed-south-africa-needs-more-investment-in-biophysics-and-structural-biology>)
- M.S. Gwizdala and T.P.J. Krüger, "How the discovery of a protein's secret function could boost solar tech", *Conversation Africa*, 28 June 2018. (<https://theconversation.com/how-the-discovery-of-a-proteins-secret-function-could-boost-solar-tech-98407>)
- M.S. Gwizdala and T.P.J. Krüger, "Proteins reveal intricate details about life under the microscope", *Conversation Africa*, 5 December 2018. (<https://theconversation.com/proteins-reveal-intricate-details-about-life-under-the-microscope-106886>)

8 OTHER SCHOLARLY RESEARCH-BASED CONTRIBUTIONS

8.1 Participation in conferences, workshops and short courses - specify type of contribution

7.2.1 National (for contributions from more than one co-author, the presenter is underlined)

1. Student symposium in Natural Sciences of the South African Academy for Science and Art, 28 October 2005, Pretoria
Oral presentation: "Die effek van 'n Fisk-Parker hibriedmagneetveld op kosmiese strale in die heliosfeer", TPJ Krüger and RA Burger
2. 50th Congress of the South African Institute for Physics, 4-7 July 2005, Pretoria
Oral presentation: "Properties of a Fisk-Parker Hybrid Magnetic Field", TPJ Krüger and RA Burger
3. 51st Congress of the South African Institute for Physics, 3-7 July 2006, Cape Town
Oral presentation: TPJ Krüger and R van Grondelle, "Modelling Ultrafast Photosynthetic Energy Transfer: Quenching Mechanisms"
4. 55th Congress of the South African Institute for Physics, 28 Sept.-1 Oct. 2010, Pretoria
Non-specialist lecture: "Biophysics and its promising contribution to South African Physics", TPJ Krüger
5. 23rd Chris Engelbrecht Summer School on "Quantum Biology", 18-28 January 2012, Salt Rock
Oral presentation: "Quantum processes in photosynthesis as revealed by single-molecule spectroscopy", TPJ Krüger and R van Grondelle
6. 41st National Convention of the South African Chemical Institute (SACI) 2013 Convention, East London, 1 – 6 December 2013.
Oral presentation: "Synthesis of II – VI metal sulphide nanoparticles by Nanosecond laser", D.C. Onwudiwe, T.P.J Krüger, O.S. Oluwatobi, C. A. Strydom
7. 56th Congress of the South African Institute for Physics, 8–12 July 2013, Richard's Bay
Non-specialist lecture: "Laser spectroscopy of natural light harvesting: unravel, regulate and control", TPJ Krüger
8. Biophysics Winter School of the 56th Congress of the South African Institute for Physics, 8 Julie 2013, Richard's Bay
 - a. Co-organiser
 - b. Two didactic lectures: "Femtosecond spectroscopy" and "Single-molecule spectroscopy: Beyond the ensemble average", TPJ Krüger
9. Workshop on Quantum Information Processing, Computing and Control, 25–30 November 2013, Umzumbe, KwaZulu-Natal
Oral presentation: "Controlling Quantum Processes in Photosynthetic Light-Harvesting Complexes of Plants", TPJ Krüger and R van Grondelle
10. 59th Congress of the South African Institute for Physics, 7-11 July 2014, Johannesburg
 - a. Session Chair (2x) for "Biophysics"
 - b. Oral presentation: "Investigation of carotenoid excited electronic states in the main plant light-harvesting complex (LHCII) via femtosecond pump-probe spectroscopy", A Singh and TPJ Krüger
 - c. Oral presentation: "Investigation of the involvement of specific carotenoids in the major plant light harvesting antenna during photoprotection" AV Paradzah, N Liguori, R Croce and TPJ Krüger (*Best oral award)
 - d. Oral presentation: "Using single-molecule spectroscopic methods to investigate the environmental dependencies of photoprotection in main plant protein involved in photosynthesis", JL Botha, JM Gruber, R van Grondelle, TPJ Krüger
 - e. Oral presentation: "The role of low-energy fluorescence bands in the photoprotection of the major plant light harvesting complex." AHG Stoltz, JM Gruber, R van Grondelle, TPJ Krüger
11. 6th South African Conference on Photonic Materials, 5-7 May 2015, Mabula Game Lodge
Invited oral presentation: "Making every photon count: Optical nanoscopy and single molecule spectroscopy applied to natural light-harvesting materials", TPJ Krüger
12. Photonics Winter School of the 60th Congress of the South African Institute for Physics, 28 June 2015,

Port Elizabeth

Invited lecture: "Design Principles of Photosynthetic Light Harvesting", TPJ Krüger

13. 60th Congress of the South African Institute for Physics, 28 June – 3 July 2015, Port Elizabeth
 - a. Oral presentation: "Using single-molecule spectroscopy methods to investigate the environmental dependencies of photoprotection in the main plant light harvesting complex" JL Botha, JM Gruber, R van Grondelle, TPJ Krüger (*best oral award)
 - b. Oral presentation: "A model describing two-exciton dynamics", JA Nöthling, T Mancal and TPJ Krüger
 - c. Oral presentation: "Study of energy transfer and photoprotection in the FCPb complex of the diatom *Cyclotella meneghiniana*", HMAM Elnour, C. Ramanan, R. van Grondelle and TPJ Krüger
 - d. Oral presentation: "Femtosecond pump-probe spectroscopy on wild-type and mutant antenna complexes from *Arabidopsis thaliana*" AV Paradzah, N Liguori, R Croce and TPJ Krüger
 - e. Oral presentation: "Using single molecule spectroscopy to study the role of low-energy fluorescence bands in the photoprotection of the major plant light harvesting complex", AHG Stoltz, JM Gruber, R van Grondelle, TPJ Krüger
 - f. Oral presentation: "Wigner distribution function and the complex curvature applied to Laguerre-Gaussian modes propagating through first order systems", C Mafusire and TPJ Krüger
14. International PhD and Postdoc Symposium on New Trends and Faces III: Photophysics in Organic Materials. 19-23 October 2015, Stellenbosch
Poster presentation: "Exciton dynamics in photosynthetic molecular aggregates", JA Nöthling, T Mancal and TPJ Krüger
15. Student symposium in Natural Sciences of the South African Academy for Science and Art, 29-30 October 2015, Bloemfontein
Oral presentation: "'n Ondersoek na die opgewekte elektroniese toestande van karotenoïede in die hoof ligversamelingskompleks van plante (LHCII) deur femtosekonde pomp–proef–spektroskopie", A Singh and TPJ Krüger (*best presentation award, extended abstract published in conference proceedings: South African Journal for Science and Technology, p a1417)
16. 1st Science Forum South Africa, 8-9 December 2015, CSIR, Pretoria
Oral presentation: "Quantum biology and biodesign: Product development in the bioeconomy", TPJ Krüger, presented in the parallel session, "Biophysics Underpins BioDesign and a Vibrant Bioeconomy"
17. Biophysics Winter School of the 61st Congress of the South African Institute for Physics, 4 July 2016 Cape Town
 - a. Co-organiser
 - b. Didactic lecture: "Single-Molecule Spectroscopy: Beyond the Ensemble Average", TPJ Krüger
18. 61st Congress of the South African Institute for Physics, 4-8 July 2016, Cape Town
 - a. Session Chair for "Biophotonics"
 - b. Oral presentation: "Ultrafast carrier dynamics in hematite thin films probed by femtosecond pump-probe spectroscopy", AV Paradzah, MM Diale and TPJ Krüger
 - c. Oral presentation: "Orthonormal vector polynomials in a general pupil." C Mafusire and TPJ Krüger
 - d. Oral presentation: "Orthonormal polynomials for centred non-uniform rotationally symmetric pupils", C Mafusire and TPJ Krüger
 - e. Poster presentation: "Applying the technique of Ultrafast Pump-Probe spectroscopy on the main plant light-harvesting complex of spinach leaves", A Singh, TPJ Krüger (*Best poster award)
19. Solar Fuel and Energy Storage Workshop of the Swiss-South African joint Research Programme, 6-7 October 2016, Pretoria
Invited oral presentation: "Design principles of photosynthetic light harvesting" TPJ Krüger
20. 62nd Congress of the South African Institute for Physics, 3-7 July 2017, Stellenbosch
 - a. Session Chair for Photonics
 - b. Non-specialist lecture: "Controlling light harvesting with light" TPJ Krüger
 - c. Oral presentation: "Orthonormal polynomials for centred non-uniform rotationally symmetric pupils", C Mafusire and TPJ Krüger
21. 6th South African Conference on Photonic Materials, 27-31 March 2017, Amanzi Game Reserve
Poster presentation: "Decay dynamics of photo-excited nanostructured α -Fe₂O₃ thin films: a fluence dependency study", AT Paradzah, K Maabong, M Diale, TPJ Krüger (*runner-up poster prize)
22. Winter School of the 63rd Congress of the South African Institute for Physics on "Applications of Luminescence", 3 July 2018, Bloemfontein

Invited lecture: "Light Harvesting", TPJ Krüger

23. 63rd Congress of the South African Institute for Physics, 3-7 July 2018, Bloemfontein
 - a. Session Chair for Photonics
 - b. Oral presentation: "How reduced excitonic coupling enhances light harvesting in the main photosynthetic antennae of diatoms", TPJ Krüger, P Maly, MTA Alexandre, T Mancal, C Büchel and R van Grondelle
 - c. Oral presentation: "Plasmon-enhanced fluorescence from individual plant light-harvesting complexes", F Kyeyune, TPJ Krüger
 - d. Poster presentation: "High-resolution confocal Raman microscopy analysis of the transparent hematite films prepared on fluorine-doped tin oxide coated glass substrates by spray pyrolysis", S Congolo, M Madito, TPJ Krüger, MM Diale
24. International Optical Society of America Network of Students Conference on "Lasers and Applications", 7-11 October 2018, Johannesburg
 - a. Oral presentation: "Investigating electron-transfer processes of supramolecular donor-acceptor complexes using femtosecond transient absorption spectroscopy" AJ Harrison, SG Radhakrishnan, TPJ Krüger (*Young researcher's award)
 - b. Poster presentation: "Structural and optical properties of hematite films prepared by chemical spray pyrolysis", JS Nyarige, TPJ Krüger, MM Diale
 - c. Poster presentation: "Laser coherent control of excitation energy flow in the LHCII complex" HMAM Elnour, R van Grondelle, TPJ Krüger
 - d. Poster presentation: "Comparative study of plasmon-enhanced emission in a fluorophore by single metal nanoparticles of different shapes", L Ugwuoke, T Mancal, TPJ Krüger
 - e. Poster presentation: "Investigating light dependent energy regulation in *Synechocystis* PCC6803 using single molecule spectroscopy", TA Gonfa, MS Gwizdala, TPJ Krüger
25. 8th Annual South African Nanotechnology Initiative (SANi) Gauteng Nanosciences Young Researcher's Symposium (NYRS), Vanderbijlpark, VUT, 16 Nov. 2018
 - a. Poster presentation: "Structural and optical properties of hematite films prepared by chemical spray pyrolysis", JS Nyarige, TPJ Krüger, MM Diale (*Runner-up poster prize)
 - b. Poster presentation: "Comparative study of plasmon-enhanced emission in a fluorophore by single metal nanoparticles of different shapes", L Ugwuoke, T Mancal, TPJ Krüger
26. 7th South African Conference on Photonic Materials
Oral presentation: "Effects of L-arginine concentration on hematite nanostructures synthesized by spray pyrolysis and chemical bath deposition" JS Nyarige, TPJ Krüger, MM Diale
27. 64th Congress of the South African Institute for Physics, 8-12 July 2019, Limpopo
 - a. Oral presentation: "Mode-mixing in nanoeggs" L Ugwuoke, T Mancal, TPJ Krüger
 - b. Oral presentation: "Light Dependent Energy Regulation in Phycobilisomes of Cyanobacteria Investigated Using Single Molecule Spectroscopy" TA Gonfa, MS Gwizdala, TPJ Krüger
 - c. Poster presentation: "Effects of temperature and precursor concentration on hematite nanoparticles prepared by chemical spray pyrolysis" JS Nyarige, TPJ Krüger, MM Diale

7.2.2 International (for contributions from more than one co-author, the presenter is underlined)

1. International Workshop on "Non-Photochemical Quenching", 24 – 27 Sept. 2006, Parsberg, Germany.
Poster presentation: "Toward Detecting Some Quenching States of the Peripheral Light-Harvesting Complex (LHCIIb) by Confocal Microspectroscopy" TPJ Krüger and R van Grondelle
2. EU FP6 Marie Curie Advanced Training in Laser Sciences (ATLAS) Workshop on "Chemical Dynamics", 16-20 Oct. 2006, Heraklion, Greece
Oral presentation: "Toward Detecting Some Quenching States of the Peripheral Light-Harvesting Complex (LHCIIb) by Confocal Microspectroscopy", TPJ Krüger and R van Grondelle
3. 16th Annual Photosynthesis Workshop "Nord West", 3 – 4 May 2007, Mülheim-an-der-Ruhr, Germany.
Poster presentation: "Investigation into the quenching states of LHCII by confocal microspectroscopy", TPJ Krüger and R van Grondelle
4. EU FP6 Marie Curie Interdisciplinary Network for Training and Research on Photosystem 2 (INTRO2) Meeting on "Macro-organization, Spectroscopy and Microscopy", 13-16 May 2007, Rőjtökmuzsaj, Hungary.
Oral presentation: "Fluorescence Spectral Shifts of LHCIIb Trimers Revealed by Confocal

- Microspectroscopy”, TPJ Krüger, VI Novoderezhkin and R van Grondelle
5. Antenna Satellite Meeting of the 14th International Congress for Photosynthesis, 19 – 22 July 2007, Drymen, Scotland.
Poster presentation: “Fluorescence Spectral Shifts of LHCII Trimers: An Indication of Quenching Processes?”, TPJ Krüger, VI Novoderezhkin and R van Grondelle
 6. 14th International Congress for Photosynthesis, 23 – 27 July 2007, Glasgow, Scotland.
Poster presentation: “Fluorescence Spectral Shifts of LHCII Trimers: An Indication of Quenching Processes?”, TPJ Krüger, VI Novoderezhkin and R van Grondelle
 7. Dutch Congress for Molecular and Cellular Biophysics, 1 – 2 October 2007, Veldhoven, the Netherlands.
Poster presentation: “Fluorescence Spectral Shifts of LHC2 Trimers Revealed by Single-Molecule Confocal Spectroscopy”, TPJ Krüger, VI Novoderezhkin and R van Grondelle
 8. EU FP6 Marie Curie Interdisciplinary Network for Training and Research on Photosystem 2 (INTRO2) Meeting, 7-11 Feb 2008, Lanzarote, Spain.
Oral presentation: “Peculiar light signals from single LHCII trimers”, TPJ Krüger, VI Novoderezhkin and R van Grondelle
 9. 10th Annual Linz Winter Workshop: “Advances in Single-Molecule Research for Biology & Nanoscience”, 14 – 17 Feb. 2008, Linz, Austria.
Poster presentation: “Single-molecule confocal spectroscopy dynamics of the main light-harvesting complex of plants”, TPJ Krüger, VI Novoderezhkin and R van Grondelle
 10. EU FP6 Marie Curie Advanced Training in Laser Sciences (ATLAS) Workshop, 18-20 Feb 2008, Amsterdam, the Netherlands.
Oral presentation: “Peculiar light signals from the main light-harvesting complex of plants”, TPJ Krüger, VI Novoderezhkin and R van Grondelle
 11. ATLAS Workshop: “New Frontiers in Micro- and Nano-Photonics”, 23-26 April 2008, Florence, Italy.
Oral presentation: “Single-molecule confocal spectroscopy dynamics of the main light-harvesting complex of plants”, TPJ Krüger, VI Novoderezhkin and R van Grondelle
 12. Dutch Congress for Molecular and Cellular Biophysics, 29 – 30 Sept. 2008, Veldhoven, the Netherlands.
Poster presentation: “Is the major plant light-harvesting complex a switch?”, TPJ Krüger, VI Novoderezhkin and R van Grondelle
 13. EU FP6 Marie Curie Interdisciplinary Network for Training and Research on Photosystem 2 (INTRO2) Meeting on “Photoprotection and Nonphotochemical Quenching”, 6-10 March 2009, Parsberg, Germany
Oral presentation, “How single LHCII trimers regulate NPQ”, TPJ Krüger, VI Novoderezhkin, E Papagiannakis, P Horton and R van Grondelle
 14. Gordon Research Conference on Photosynthesis, 28 June-3 July 2009, Smithfield, USA
Poster presentation: “Single-molecule spectroscopy reveals conformational switching in plant light-harvesting complexes”, TPJ Krüger, VI Novoderezhkin, P Horton, E Wientjes, R Croce and R van Grondelle
 15. Dutch Congress for Molecular and Cellular Biophysics, 6-7 October 2009, Veldhoven, the Netherlands
Oral presentation: “Single-molecule spectroscopy reveals conformational switching in plant light-harvesting complexes” TPJ Krüger, VI Novoderezhkin, P Horton, E Wientjes, R Croce and R van Grondelle
 16. “HARVEST” EU FP7 Marie Curie Research Training Network Start-Up Meeting, 29 Nov.-2 Dec. 2009, Naantali, Finland
Invited oral presentation: “Single-Molecule Spectroscopy”, TPJ Krüger
 17. Antenna Satellite Meeting of the 15th International Congress for Photosynthesis, 18 – 22 August 2010, Tianjin, China
 - a. Invited oral presentation: “NPQ in LHCII: A single-molecule approach”, TPJ Krüger, C Illoaia, MP Johnson, AV Ruban, P Horton and R van Grondelle
 - b. Poster presentation: “Insights into the NPQ mechanism(s) using Single Molecule Spectroscopy (SMS) on light-harvesting complexes of higher plants”, C Illoaia, TPJ Krüger, MP Johnson, P Horton, AV Ruban and R van Grondelle
 18. 15th International Congress for Photosynthesis, 22-27 August 2010, Beijing, China
 - a. Oral presentation: “Switching Proteins and Regulation of Light-Harvesting in Photosynthesis” R van Grondelle and TPJ Krüger

- b. Poster presentation: "Insights into the NPQ mechanism(s) using Single Molecule Spectroscopy (SMS) on light-harvesting complexes of higher plants", C Ilioaia, TPJ Krüger, MP Johnson, P Horton, AV Ruban and R van Grondelle
19. 3rd African Laser Centre Workshop, 25 September 2010, Stellenbosch, South Africa
Invited oral presentation: "How plants regulate solar energy absorption on the single-molecule level", T.P.J. Krüger, C Ilioaia, V.I. Novoderezhkin and R. van Grondelle*
20. "HARVEST" EU FP7 Marie Curie Research Training Network Meeting "Mechanisms of Nonphotochemical Quenching", 6-10 April 2011, Passau, Germany.
Invited oral presentation: "Controlled disorder in LHCII trimers explains their photoprotective role", TPJ Krüger, C Ilioaia, MP Johnson, AV Ruban, E Papagiannakis, P Horton and R van Grondelle
21. Light-Harvesting Processes Meeting, 10-14 April 2011, Banz, Germany
a. Poster presentation: "Controlled disorder in LHCII trimers explains their photoprotective role", TPJ Krüger, C Ilioaia, MP Johnson, AV Ruban, P Horton and R van Grondelle
b. Poster presentation: "Probing the fluorescence dynamics of a series of LH2 complexes isolated from *Rhodospseudomonas palustris*." A Gall, TPJ Krüger, C Ilioaia, O Ilioaia, B Robert and R van Grondelle
22. OCP Meeting on "Photoprotection in Cyanobacteria", 14-15 June 2012, Paris, France
Oral presentation: "Single-molecule fluorescence spectroscopy: seeing the NPQ-switch in real time", TPJ Krüger, GS Gwizdala, R Berera, D Kirilovski and R van Grondelle
23. Gordon Research Conference on Photosynthesis, 8-13 July 2012, Davidson College, NC, USA
Poster presentation: "Controlled disorder in plant light-harvesting complex II explains its photoprotective role", TPJ Krüger, C Ilioaia, MP Johnson, AV Ruban, E Papagiannakis, P Horton and R van Grondelle
24. Gordon Research Conference on Single-Molecule Approaches to Biology: Understanding Life at a Higher Resolution, 15-20 July 2012, Mt. Snow Resort, VT, USA
Poster presentation: "The functional significance of fluorescence blinking in plants", TPJ Krüger, C Ilioaia, MP Johnson, AV Ruban, E Papagiannakis, P Horton and R van Grondelle
25. Harvesting Light Symposium, 6-7 Dec. 2012, Amsterdam, the Netherlands.
Poster presentation: "Controlled disorder explains photosynthetic protein multifunctionality", TPJ Krüger, C Ilioaia, E Wientjes, J Chmeliov, R Croce, L Valkunas and R van Grondelle (*poster award)
26. Light-harvesting Satellite Meeting of the 16th International Congress on Photosynthesis Research, 8-11 Aug. 2013, St. Louis, MO, USA
Poster presentation: "Controlled disorder: explaining functional changes of light-harvesting proteins", TPJ Krüger, P Horton, L Valkunas and R van Grondelle
27. 16th International Congress on Photosynthesis Research, 11-16 Aug. 2013, St. Louis, MO, USA
Poster presentation: "Red emission states of the main plant light-harvesting complex: involvement in photoprotection determined by controlled disorder", TPJ Krüger, C Ilioaia, MP Johnson, AV Ruban and R van Grondelle
28. 139th OMICS Group Conference International Conference and Exhibition on Lasers, Optics & Photonics, 7-9 October 2013, San Antonio, USA
Poster presentation: "Nanosecond laser irradiation synthesis of CdS nanoparticles in a PVA system", DC Onwudiwe, TPJ Krüger, OS Oluwatobi, and CA Strydom
29. Inter-Continental Advanced Materials for Photonics (I-CAMP) Summer School, 14-29 June 2014, Stellenbosch
Four invited didactic lectures: "Design Principles in Photosynthetic Light Harvesting", TPJ Krüger
30. 20th International Workshop on "Single Molecule Spectroscopy and Ultrasensitive Analysis in the Life Sciences", 2-5 September 2014, Berlin, Germany.
a. Poster presentation: "Tuning the functionality of individual light-harvesting proteins", TPJ Krüger, MTA Alexandre, JM Gruber, R van Grondelle
b. Poster presentation: A glimpse into the protein dynamics governing the fate of electronic excitations in single C2S2 supercomplexes of Photosystem II, JM Gruber, J Chmeliov, P Xu, TPJ Krüger, R Croce, L Valkunas and R van Grondelle
31. Quantum Africa Conference, 22-26 September 2014, Rabat, Morocco
Invited oral presentation: "Photosynthetic light harvesting on the single molecule level: disorder and design", TPJ Krüger and R van Grondelle

32. International Discussion Workshop on “The Future of Quantum Biology”, 16-19 December 2014, Thula Thula Game Reserve, KwaZulu-Natal, South Africa
Session Chair and invited oral presentation: “Photoprotection and Regulation; Single Molecule Spectroscopy”, TPJ Krüger
33. Lorentz Center Workshop on “Good Vibrations for Energy Management in Biomolecules”, 23-27 Feb. 2015, Leiden, the Netherlands
 - a. Session Chair on “Isomerization, Enzyme Catalysis and implications for Biology”
 - b. Poster presentation: “Design principles for light harvesting regulation as revealed by single molecule spectroscopy”, TPJ Krüger, MTA Alexandre, JM Gruber, P Maly, T Mancal, R Croce and R van Grondelle
34. VU Amsterdam Lustrum Conference: Science for Sustainability, 26-27 November 2015, Amsterdam, the Netherlands
 - a. Invited presentation: “Transformation for sustainability in higher education in South Africa”, HMAM Elnour, TPJ Krüger
 - b. Poster presentation: “Sunlight harvesting: A single molecule perspective”, MS Gwizdala, TPJ Krüger and R van Grondelle
35. Quantum Effects in Biology School, 2-3 June 2016, Durban, South Africa
 - a. Session Chair
 - b. Invited didactic lecture: “Introduction to photosynthetic light harvesting: structure, function, techniques and control”, TPJ Krüger
36. Quantum Effects in Biology Conference, 6-9 June 2016, Durban, South Africa
 - a. Oral presentation: “Single-molecule excitonic dynamics for robust functionality of plant and diatom light-harvesting complexes.” TPJ Krüger, MTA Alexandre, P Maly, C Büchel, T Mancal, R van Grondelle
 - b. Poster presentation: “Ultrafast pump-probe spectroscopic investigations of the energy transfer dynamics in the main light-harvesting complex of plants and diatoms.” HMAM Elnour, AT Paradzah, A Singh, C Ramanan, L Dietzel, N Liguori, C Büchel, R Croce, R van Grondelle and TPJ Krüger
 - c. Poster presentation: “Exciton dynamics of individual plant light-harvesting complexes as revealed by fluorescence lifetime, intensity and spectral shifts”, JL Botha, AHG Stoltz, TPJ Krüger, JM Gruber and R van Grondelle
 - d. Poster presentation: “Exciton dynamics in photosynthetic molecular aggregates.” JA Nöthling, TPJ Krüger and T Mancal
 - e. Poster presentation: “Controlling light harvesting with light.”, MS Gwizdala, D Kirilovsky, R van Grondelle and TPJ Krüger
37. International Conference on nanostructures and nanomaterials, 3-8 July 2016, Sicily Italy.
Poster presentation: “Synthesis and Characterization of Gold nanorods for Single Molecule Spectroscopy Application”: F. Kyeyune, B. S. Mwankemwa, T.P.J. Krüger and M. Diale
38. Siegman International School on Lasers, 24 – 29 July 2016, Barcelona, Spain
 - a. Poster presentation: “Ultrafast pump-probe spectroscopic investigations of the energy transfer dynamics in the main light-harvesting complex of plants and diatoms”, HMAM Elnour, AT Paradzah, A Singh, C Ramanan, L Dietzel, N Liguori, C Büchel, R Croce, R van Grondelle, TPJ Krüger
 - b. Poster presentation: “Investigating the excited electronic states of carotenoids in the main plant light-harvesting complex (LHCII) via femtosecond pump-probe spectroscopy”, A Singh, TPJ Krüger
39. Light Harvesting Satellite Meeting 2016, 4-7 August 2016 in Egmond aan Zee, The Netherlands
 - a. Poster presentation: “Single-molecule excitonic dynamics for robust functionality of diatom light-harvesting complexes”, TPJ Krüger, MTA Alexandre, P Maly, C Büchel, T Mancal, R van Grondelle
 - b. Poster presentation: “Controlling light harvesting with light”, MS Gwizdala, D Kirilovsky, R van Grondelle, and TPJ Krüger
 - c. Poster presentation: “Exciton dynamics in photosynthetic molecular aggregates”, JA Nöthling, TPJ Krüger, T Mancal
40. 17th International Congress for Photosynthesis, 7-12 August 2016, Maastricht, The Netherlands
 - a. Oral presentation: “Hidden dynamics of phycobilisomes – how their switching depends on illumination”, MS Gwizdala, D Kirilovsky, R van Grondelle, and TPJ Krüger
 - b. Poster presentation: “Exciton dynamics in photosynthetic molecular aggregates”, JA Nöthling, TPJ Krüger, T Mancal

41. European Advanced Materials Congress in Stockholm, Sweden, 23-25 August 2016
Poster presentation: "Pt(II) Fischer multi-carbene complexes: Synthesis and Photophysics", N Weststrate, S Lotz, SG Radhakrishnan, TPJ Krüger, AV Paradzah, RF Winter
42. International Genetically Engineered Machine (iGEM) Competition, Boston, USA, 27-31 October 2016
Adviser of the UP Team project "WattsAptamer" (see http://2016.igem.org/Team:Pretoria_UP)
43. 9th African Laser Centre Student Workshop, 24 – 26 November 2016, Stellenbosch
 - a. Oral presentation: "Ultrafast electron and hole dynamics of photo-excited hematite thin films: An intensity dependency study" AT Paradzah, MM Diale and TPJ Krüger
 - b. Oral presentation: "Single particle spectroscopy of hematite-biological light harvesting structures." HA Vasco, MM Diale and TPJ Krüger
44. 3rd International Conference on Tetrapyrrole Photoreceptors of Photosynthetic Organisms (ICTPPO), 9-13 July 2017, Chicago, USA
Oral presentation: "Controlling light harvesting with light", M.S. Gwizdala, R. Berera, D. Kirilovsky, R. van Grondelle and T.P.J. Krüger
45. Gordon Research Seminar on Photosynthesis, 15-16 July 2017, Sunday River, Newry, USA
Poster presentation: "Phycocyanin: one complex, two states, two functions", MS Gwizdala, TPJ Krüger, Md. Wahadoszamen, J.M. Gruber, D. Kirilovsky, R. van Grondelle
46. Gordon Research Conference on Photosynthesis, 16-21 July 2017, Sunday River, Newry, USA
Poster presentation: "Phycocyanin: one complex, two states, two functions", MS Gwizdala, TPJ Krüger, Md. Wahadoszamen, J.M. Gruber, D. Kirilovsky, R. van Grondelle
47. 10th African Laser Centre Student Workshop, 30 Nov. – 2 Dec. 2017, Stellenbosch
Oral presentation: "Ultrafast transient absorption spectroscopy of hematite nanoparticles for water splitting applications" AT Paradzah, M Diale, TPJ Krüger
48. Gordon Research Seminar on Single Molecule Approaches to Biology, 14 – 15 July 2018, Mount Snow, West Dover, United States
Poster presentation: "Nano Meets Bio: Plasmonic interaction of the main plant light-harvesting complex at the single molecule level" F Kyeyune, JL Botha, M Diale, and TPJ Krüger
49. Gordon Research Conference on Single Molecule Approaches to Biology, 15 – 20 July 2018, Mount Snow, West Dover, United States
Poster presentation: "Plasmon-enhanced fluorescence of the main plant light harvesting complex: A single-molecule fluorescence study", F Kyeyune, JL Botha, M Diale, and TPJ Krüger
50. 11th African Laser Centre Student Workshop, 22 – 24 November 2018, Stellenbosch
 - a. Oral presentation: "Investigating light dependent energy regulation in Synechocystis PCC6803 using single molecule spectroscopy", TA Gonfa, MS Gwizdala, TPJ Krüger
 - b. Oral presentation: "Structural and optical properties of hematite films prepared by laser spray pyrolysis with gold nanoparticles as under layer" JS Nyarige, TPJ Krüger, MM Diale
51. Quantum Effects in Biology Conference, 10-13 July 2018, Vilnius, Lithuania
 - a. Oral presentation: "How reduced excitonic coupling enhances light harvesting in the main photosynthetic antennae of diatoms", TPJ Krüger, P Maly, MTA Alexandre, T Mancal, C Büchel and R van Grondelle
 - b. Poster presentation: "Phycobilisomes' rich hidden life revealed by single molecule spectroscopy" MS Gwizdala, TPJ Krüger
52. Joint 12th EBSA, 10th ICBP-IUPAP Biophysics Congress, 20 – 24 July 2019, Madrid, Spain)
Poster presentation: "Controlling photosynthetic light harvesting"

8.2 Teamwork and collaboration with others:

Other researchers (national and international)

Past

- Dr Steven Hussey (UP FABI): 2016 International Genetically Engineered Machine project of UP
- Prof Debra Meyer (UP Biochemistry)
- Prof. Christien Strydom, Dr Damian Onwudiwe (Northwest University)
- Prof. W.E. Moerner (Stanford University, USA)
- Prof. Alexander Ruban (Queen Mary University of London, UK)
- Prof. Peter Horton (University of Sheffield, UK)

Active (with research output)

- Prof Simon Lotz and Dr Shankara Radhakrishnan (UP Chemistry)
- Prof Mmantsae Diale (UP Physics)
- Prof. Rienk van Grondelle and Prof. Roberta Croce (VU University Amsterdam, the Netherlands)
- Prof. Leonas Valkunas (Vilnius University, Lithuania)
- Prof. Bruno Robert, Dr. Andrew Gall and Dr Diana Kirilovsky (CEA Saclay, France)
- Prof. Tomas Mancal (Charles University, Prague, Czech Republic)
- Prof Claudia Büchel (University of Frankfurt, Germany)
- Prof Vladimir Novoderezhkin (Moscow State University, Russia)
- Prof. Gabriela Schlau-Cohen (MIT, USA)

New

- Prof Joseph Asante (TUT)
- Prof Don Cowan (UP Genomics Research Institute)
- Prof Leslie Dutton (University of Pennsylvania, USA)
- Prof Paul Curmi (University of New South Wales)
- Dr Radek Kana, Dr Erica Belgio (Academy of Sciences of the Czech Republic)
- Prof. Noam Adir (Technion – Israel Institute of Technology)

8.3 Membership in national and international bodies

- South African Young Academy of Science, SAYAS (2019)
- African Academy of Science (2017 – current)
- University of Pretoria Young Academy (2017 – current)
- Biophysical Society (2016 – current)
- International Society for Photosynthesis Research: Ordinary member (2016 – current)
- South African Institute for Physics (SAIP): Ordinary member (2004 – current)
- SAIP Applied Physics: Biophysics Liaison (2014 – current)
- SAIP Biophysics Initiative: Deputy Chair (2013), Chair (2014 – current),
(<http://biophysics.saip.org.za/newsite/>)

8.4 Visits to local and overseas universities or research institutes as guest professor or researcher

CEA-Saclay, France (Institute of Biology Technologies)

Guest researcher of Prof. Bruno Robert to perform vibrational spectroscopy experiments on light-harvesting complexes of diatoms and cyanobacteria. September 2018.

Gobabeb Research and Training Centre, Namibia

April 2017 and April 2018

Investigation of the photosynthetic activity in hypoliths and *Welwitschia* plants.

Albert-Ludwigs University of Freiburg, Germany (Freiburg Institute for Advanced Studies, FRIAS)

March – April 2015: FRIAS Fellowship to conduct research in the 2014/2015 FRIAS Research Focus titled “Designed Quantum Transport in Complex Materials”

Research Focus Director: Andreas Buchleitner

Vrije Universiteit Amsterdam, the Netherlands (Unit of Biophysics & LaserLaB Amsterdam)

Guest researcher on the following projects:

- 30 March – 11 April 2014: “Investigating NPQ in LHCII using single-molecule spectroscopy and ultrafast pump-probe spectroscopy on LHCII mutants”; “Investigating the role of red emission states in diatom light-harvesting complexes”
- 29 November – 4 December 2015: “Multipulse spectroscopy on LHCII”
- 21 November – 23 December 2016: “2D Electronic Spectroscopy on plant PSI”

10 MANAGEMENT AND ADMINISTRATIVE DUTIES

10.1 List your involvement in departmental activities (e.g. administrative functions), faculty (e.g. faculty committees) or other university activities.

- Inaugural fellow of the Tuks Young Research Leader Programme, 2015/2016. The programme aims to grow early career academics at UP in the areas of thought leadership, team development, engagement and collaboration, with the intention of enabling them to solve the complex issues that face society
- Departmental: Teaching and Learning Committee; Outreach and Marketing Committee

11 COMMUNITY SERVICE OR PROFESSIONAL SKILLS

11.1 Outreach projects

- National Science Week 2015 – 2018
- Scifest Africa 2017, 2018 (South Africa's National Science Festival in Grahamstown)
- Outreach activities with local photonics student chapters to various schools
- Visits to the following universities: TUT, WITS, NWU, UFS, UKZN, SU, UWC, and UCT.
- Organisation of public lectures at UP:
 - In liaison with Southern Africa Association for the Advancement of Science (S2A3) (2015, 2017, 2018)
 - In liaison with the Academy of Science of South Africa (ASSAf) (2019)

11.2 Involvement with other universities/scientific institutions

(e.g. external examiner, editor of journal, advisory council, CSIR, SA Council for Scientific Professions)

1. External examiner of the following PhD theses:
 - a. AJ Hendriks, "Control of CO₂ Vibrational Dynamics via Shaped-Pulse Coherent Anti-Stokes Raman Spectroscopy", Stellenbosch University, December 2016
 - b. NA Bhebhe, "Creation and analysis of structured light fields for application in optical tweezers", University of the Witwatersrand, January 2019
 - c. CM Mabena, "Distortion correction for free-space quantum communication", University of the Witwatersrand, June 2019
2. External examiner of the following MSc dissertations:
 - a. NBC Pfukwa, "Surface Enhanced Raman spectroscopy (SERS) of biomolecules", Stellenbosch University, March 2016
 - b. X von Stein, "Ultrafast photochromism in metal-organic Complexes", Stellenbosch University, September 2016
 - c. PL Els, "Formation of prebiotic Hydrogen Cyanide dimers in an astrophysical environment", Northwest University, December 2018
3. Reviewer of the five-year NRF-RISA South African Research Chairs Programme (2016)
4. Advisory Panel Member for NRF Freestanding, Innovation, Scarce Skills & TWAS Post-Doctoral Fellowships (2016)
5. Reviewer for NRF/DST Freestanding, Innovation and Scarce Skills postdoctoral fellowship applications (2017).
6. Reviewer for NRF Thuthuka applications (2017)
7. Reviewer for NRF Competitive Support for Rated Researchers (2018, 2019)
8. Reviewer for NRF Competitive Support for Y-rated Researchers (2019)
9. Reviewer for US Department of Energy (2018)
10. Reviewer for the UK Biotechnology and Biological Sciences Research Council (2019)
11. ERC Consolidator grant review (2019)

11.5 Referee duties

1. Langmuir (IF 3.8)
 - a. Manuscript ID la-2014-01483s (2014)
 - b. Manuscript ID: la-2018-02307f (2018)
2. Chemical Science (IF 8.7): Manuscript ID: SC-EDG-06-2015-002137 (2015)
3. Chemical Reviews (IF 52.6): Manuscript ID cr-2016-00195 (2016)
4. Photosynthesis Research (IF 3.1):
 - a. Manuscript ID: PRES-D-14-00029R1 (2014)
 - b. Manuscript ID: PRES-D-16-00221 (2016)
 - c. Manuscript ID PRES-D-17-00017 (2017)
5. Physica B: Condensed Matter (IF 1.5): Manuscript ID PHYSB-D-15-00885 (2015)

6. Proceedings of the South African Institute of Physics Annual Conference: several manuscripts (2015 - 2018)
7. Journal of Physical Chemistry Letters (IF 8.7): Manuscript ID jz-2017-02634 (2017)
8. Journal of Physical Chemistry C (IF 4.5): Manuscript ID jp-2019-00919h (2019)

12 AWARDS AND SCIENTIFIC/SCHOLARLY RECOGNITION

12.1 Evaluation status as scientist/scholar

NRF Y1 rating: 2017

On 20 August 2019, I had a citation record of 968 citations (Google Scholar) or 726 (Scopus) and an H-index of 17 (Google Scholar) or 15 (Scopus).

12.2 Research awards and prizes

- EU FP6 Marie Curie Scholarship for PhD study, 2006
- PhD thesis endowed 'cum laude': Vrije Universiteit Amsterdam, 2011
- Fellowship from the Freiburg Institute for Advanced Studies (FRIAS) at the Albert-Ludwigs University of Freiburg in Germany, 2015
- TUKS Young Research Leader, 2016
- Y1 Rating from the National Research Foundation, 2016
- University of Pretoria Academic Achievers Award, 2017
- University of Pretoria Exceptional Young Researcher's Award, 2018
- Royal Society of South Africa Meiring Naudé Medal, 2019