Doran I. G. B(ennett) Raccah, Ph.D.

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Education

2015 - 2019	**Harvard University**, Post-Doctoral Fellow
2008 - 2013	**UC Berkeley**, Ph.D., Chemistry
2003 - 2007	**University of Chicago**, B.A./M.S. Chemistry, B.S. Applied Mathematics

Research and Professional Experience

Fall 2023 -	**(expected) Assistant Professor**, University of Texas Austin, Dept. of Chemistry
2019 - 2023	**Assistant Professor**, Southern Methodist University, Dept. of Chemistry
2015 -2019	**Post-Doctoral Fellow**, Harvard University, Dept. of Chemistry & Chemical Biology Advisor: Alan Aspuru-Guzik
2013 - 2015	**Senior Chemist**, Dow Chemical Co., Inorganic Materials & Heterogeneous Catalysis
2008 - 2013	**Graduate Student**, UC Berkeley, Dept. of Chemistry Advisor: Graham Fleming
2007 - 2008	**Research Assistant**, University of Maryland, Dept. of Chemistry Advisor: Millard Alexander
2003 - 2007	**Research Assistant**, University of Chicago, Dept. of Chemistry Advisor: Laurie Butler

Honors and Awards

Fellowships

Visiting Scholar, Max Plank Institute for the Physics of Complex Systems	2019
CIFAR - Bio-Inspired Light Harvesting Post-Doctoral Fellow	2016-2019
Dow Chemical Rotational Fellow	2013-2015
NSF Graduate Research Fellowship: Physical Chemistry	2007-2011
DAAD RISE Professional	2007
Goldwater Scholar	2006
Beckman Scholar	2005-2007

Academic Recognition

NSF-CAREER Award	2022
International Conference on Microbial Photosynthesis Travel Award	2018
Biophysical Society Travel Award	2018
Clean Energy Poster Prize: Excited State Process Conference	2016
Dan Lucas Memorial Prize: UC Berkeley	2009
Outstanding Graduate Student Instructor: UC Berkeley	2009
Student Marshal: University of Chicago	2007
Phi Beta Kappa	2007
Chemical Industry Council of Illinois Scholar	2007
Physical Chemistry Poster Prize: ACS Fall Meeting	2006

Mesoscience Lab at 3 Years

External Funding Received

Number of Grants	5
Total Budget for Mesoscience Lab	$1,441,466
Total Amount	$2,961,466

CAREER: Simulating mesoscale quantum dynamics and non-linear microscopy

PI	Bennett
co-PI	–
Source of Support	National Science Foundation (NSF-CHEM)
Total award amount	$650,000
Total award period	Feb 1, 2022 – Jan 31, 2027
Award Number	2145358

Adaptation of photosynthetic membranes to environmental change

PI	Bennett
co-PI	Roberta Croce, Ben Engel
Source of Support	Human Frontiers Science Program (HFSP)
Total award amount	$1,095,000 (Mesoscience Budget $365,000)
Total award period	Dec. 1, 2021 – Nov. 31, 2024
Award Number	RGP0005/2021

Start-up Grant: Cyanobacteria light harvesting when iron is scarce

PI	Bennett
co-PI	Nir Keren, WE Moerner
Source of Support	Binational Science Foundation (BSF)
Total award amount	$75,000 (Mesoscience Budget $75,000)
Total award period	Oct. 1, 2020 – Sept. 30, 2022
Award Number	2019330

Mesoscale quantum dynamics in new semiconductor materials

PI	Bennett
co-PI	–
Source of Support	Welch Foundation
Total award amount	$240,000
Total award period	June 1, 2020 – May 31, 2023
Award Number	N-2026-20200401

NSF-BSF: High-resolution mapping of the protein landscape in plant photosynthetic membranes

PI	Helmut Kirchoff
co-PI	Bennett
Source of Support	National Science Foundation (NSF-MCB)
Total award amount	$901,466 (Mesoscience Budget $111,466)
Total award period	May 1, 2020–April 30, 2023
Award Number	1953570

Student Award and Honors

- Moody Fellowship (five years full funding: $150,000) [Jacob Lynd]
- SMU Chemistry Dept Outstanding Teaching Assistant Award [Bailey Raber]
- Presentation Poster Prize at APS Regional Meeting [Leo Varvelo]
- 2nd place Physical/Computational talk at ACS DFW Meeting-in-Miniature (2021) [Leo Varvelo]
- Undergraduate Speaking Prize at ACS DFW Meeting-in-Miniature (2021) [Jacob Lynd]

- 3rd place Physical/Computational talk at ACS DFW Meeting-in-Miniature (2022) [Jacob Lynd]
- Poster Prize - Eastern Regional Photosynthesis Conference (2023) [Mohamed Elrefaiy]

Post-doc Award and Honors

- Poster Prize - Eastern Regional Photosynthesis Conference (2023) [Kajwal Patra]

Publications

*** - Corresponding Author**

24. T. Gera, L. Chen, A. Eisfeld, J. R. Reimers, E. J. Taffet, **D. I. G. B. Raccah***
Simulating optical linear absorption for mesoscale molecular aggregates: an adaptive hierarchy of pure states approach.
J. Chem. Phys., arXiv:2301.03718 (2023)
[Editor's Choice] [Cover Image]

23. L. Varvelo, J. K. Lynd, B. Citty, O. Kühn, **D. I. G. B. Raccah***
Formally Exact Simulations of Mesoscale Exciton Diffusion in a Light-Harvesting 2 Antenna Nanoarray.
J. Phys. Chem. Lett., *14* 3077 (2023)

22. L. Chen*, **D. I. G. Bennett***, A. Eisfeld*
Calculating nonlinear response functions for multidimensional electronic spectroscopy using dyadic non-Markovian quantum state diffusion.
J. Chem. Phys., *157* 114109 (2022)

21. L. Chen*, **D. I. G. Bennett***, A. Eisfeld*
Simulation of absorption spectra of molecular aggregates: a hierarchy of stochastic pure states approach.
J. Chem. Phys., *156* 124109 (2022)

20. W. Nawrocki, X. Liu, B. Raber, C. Hu, C. de Vitry, **D. I. G. Bennett**, R. Croce
Molecular origins of induction and loss of photoinhbition-related energy dissipation q_I.
Science Advances, *7* eabj0055 (2021)

19. L. Varvelo, J. K. Lynd, **D. I. G. Bennett***
Simulating mesoscale quantum dynamics with an adaptive hierarchy of pure states.
Chemical Science, *12* 9704-9711 (2021)

18. J.C. Dean, **D. I. G. Bennett**, M. Saniforth, M. Maiuri
Editorial: Vibrationally-mediated chemical dynamics
Frontiers in Chemistry, *9* 681457 (2021)

17. H. Zhou, F. Wang, **D. I. G. Bennett**, P. Tao
Directed kinetic transition network model.
J. Chemical Physics, *151* 144112 (2019)

Prior to SMU

16. **D. I. G. Bennett**, K. Amarnath, S. Park, C. J. Steen, J. Morris, G. R. Fleming
Models and Mechanisms of the Rapidly Reversible Regulation of Photosynthetic Light harvesting
Open Biology, *9* 190043 (2019)

15. C. Chuang, **D.I.G. Bennett**, J. R. Caram, A. Aspuru-Guzik, M. G. Bawendi, J. Cao
Generalized Kasha's Model: T-Dependent Spectroscopy Reveals Short-Range Structures of 2D Excitonic Systems
Chem, *12* 3135 (2019)

14. **D.I.G. Bennett***, G. R. Fleming*, K. Amarnath*
Energy-dependent quenching adjusts the excitation diffusion length to regulate photosynthetic light harvesting.
PNAS, *115* E9523 (2018)

13. **D.I.G. Bennett***, P. Maly, C. Kreisbeck, R. van Grondelle, A. Aspuru-Guzik
Mechanistic regimes of vibronic transport in a heterodimer and the design principle of incoherent vibronic transport in phycobiliproteins
J. Physical Chemistry Letters, 10 2665 (2018)

12. S. Blau†, **D.I.G. Bennett†**, C. Kreisbeck, G. Scholes, A. Aspuru-Guzik
Local protein solvation drives direct down-conversion in phycobiliprotein PC645 via incoherent vibronic transport
PNAS, *115* E3342 (2018)

11. S. Doria, J. R. Caram, T. S. Sinclair, **D.I.G. Bennett**, C. Chuang, F. Freyria, C. P. Steiner, P. Foggi, K. Nelson, J. Cao, A. Aspuru-Guzik, S. Lloyd, M. G. Bawendi
Photochemical Control of Exciton Superradiance in Light Harvesting Nanotubes
ACS Nano, *12* 4556 (2018)

10. K. Amarnath*, **D.I.G. Bennett***, A. Schneider, G. R. Fleming*
Multiscale Model of Light Harvesting by Photosystem II in Plants
PNAS, *113* 1156 (2016)

9. J.J.J. Roden, **D.I.G. Bennett**, K. B. Whaley
Long Range Energy Transport in Photosystem II
J. Chemical Physics, *144* 245101 (2016)

8. **D.I.G. Bennett**, K. Amarnath, G. R. Fleming
A structure based model of energy transfer reveals the principles of light harvesting in photosystem II supercomplex
JACS, *135*, 9164 (2013)

7. S. J. McGurk, M. L. McKendrick, M. L. Costen, **D.I.G. Bennett**, J. Klos, M. H. Alexander, P. J. Dagdigian
Depolarization of Rotational Angular Momentum in CN+Ar Collisions
J. Chemical Physics, *136*, 164306 (2012)

6. J. M. Dawlaty, **D.I.G. Bennett**, V. M. Huxter, G. R. Fleming
Mapping the spatial overlap of excitons in a photosynthetic complex via coherent nonlinear frequency generation.
J. Chemical Physics, *135*, 044201 (2011)

5. A. Khachatrian, P. J. Dagdigian, **D.I.G. Bennett**$^{\#}$, F. Lique, J. Klos, M. H. Alexander
Experimental and Theoretical Study of Rotationally Inelastic Collisions of CN with N_2.
J. Physical Chemistry A, *113*, 3922 (2009)

4. B. L. J. Poad, P. J. Wearne, E. J. Bieske, A. A. Buchachenko, **D.I.G. Bennett**$^{\#}$, J. Klos, M. H. Alexander
The $Na^{(+)}$–H_2 cation complex: Rotationally resolved infrared spectrum, potential energy surface, and rovibrational calculations.
J. Chemical Physics, *129*, 184306 (2008)

3. **D.I.G. Bennett**, L. J. Butler, H.-J. Werner
Comparing Electronic Structure Predictions for the Ground State Dissociation of the Vinoxy Radical
J. Chemical Physics, *127*, 094309 (2007)

2. M. J. Bell, K.-C. Lau, M. J. Krisch, **D.I.G. Bennett**, L. J. Butler, F. Weinhold
Characterization of the Methoxy Carbonyl Radical Formed via Photolysis of Methyl Chloroformate at 193 nm.
J. Physical Chemistry A, *111*, 1762 (2007)

1. L. R. McCunn, **D.I.G. Bennett**, L. J. Butler, H. Fan, F. Aguirre, and S. T. Pratt
Photodissociation of Propargyl Chloride at 193 nm

J. Physical Chemistry A, *110*, 843 (2006)

Presentations

Dept. of Physics, Oregon State University, Corvallis, OR (USA)	Invited	2023
ACS National Convention (Spring), Indianapolis, IN (USA)	Invited	2023
Telluride Workshop: Spatio-Temporal Dynamics of Excitons, Telluride, CO (USA)	Invited	2022
Coherent Multidimensional Spectroscopy Conference (CMDS), Austin, TX (USA)	Invited	2022
Photosynthesis Research Lab, Michigan State University, East Lansing, MI (USA)	Invited	2022
Telluride Workshop: Quantum Frontiers, Telluride, CO (USA)	Invited	2022
Dept. of Chemical and Biological Eng., Albuquerque, NM (USA)	Invited	2022
ACS Spring Meeting, San Diego, CA (USA)	Invited	2022
Dept. of Chemistry, Wayne State University, Zoom (USA)	Invited	2022
Dept. of Chemistry, UT Austin, Austin, TX (USA)	Invited	2022
Berkeley Lab, Molecular Biophysics and Integrated Bioimaging Division, (Zoom)	Invited	2022
Dept. of Chemistry, Texas Tech University, (Zoom)	Invited	2021
UT Tyler, Undergraduate ACS Chapter, Tyler, TX (USA)	Invited	2021
ISPR: Computational Methods in Photosynthesis Conference, (Zoom)	**Keynote**	2021
ACS Southwest Regional Conference, Austin, TX (USA)	Invited	2021
Loyola University of Chicago, Dept. of Chemistry, (Zoom)	Invited	2021
Telluride Workshop: Spatio-Temporal Dynamics of Excitons, (Zoom)	Invited	2021
Western Regional Photosynthesis, (Zoom)	Invited	2021
Dept. of Physics, Rostock University (DE), (Zoom)	Invited	2021
Workshop: Excitons at Different Length Scales and Dimensionality, (Zoom)	Invited	2020
Virtual Conference on Theoretical Chemistry, (Zoom)	Invited	2020
Telluride Workshop, Telluride (USA)	[Invited, Canceled]	2020
McGill MiniScience Meeting, Montreal (CA)	[Invited, Canceled]	2020
ACS Spring Meeting, Philadelphia, PA (USA)	[Canceled]	2020
Dept. of Chemistry, Midwestern State University, Wichita Falls, TX (USA)	Invited	2020
Dept. of Chemistry, University of Texas, Dallas, Dallas, TX (USA)	Invited	2019
Dept. of Biology, Southern Methodist University, Dallas, TX (USA)	Invited	2019
Dept. of Chemistry, Angelo State University, San Angelo, TX (USA)	Invited	2019
Dept. of Chemistry, LeTourneau University, Longview, TX (USA)	Invited	2019
American Chemical Society Fall Meeting, San Diego, CA (USA)		2019

Prior to SMU

Dept. of Chemistry, Southern Methodist University, Dallas (USA)	Invited	2018
Dept. of Chemistry, Duquesne University, Pittsburg (USA)	Invited	2018
Dept. of Chemistry, Colorado School of Mines, Golden (USA)	Invited	2018
Dept. of Chemistry, City University of New York, New York (USA)	Invited	2018
American Chemical Society Fall Meeting, Boston (USA)		2018
International Conference on Microbial Photosynthesis, Vancouver (CA)	Travel Award	2018
Dept. of Chemistry, University of Pennsylvania, Philadelphia (USA)	Invited	2018
Quantum Effects in Biology, Vilnus (LTU)		2018
Quantum Simulators Workshop, Eugene (USA)	Invited	2018
Eastern Regional Photosynthesis, Woods Hole (USA)		2018
Bio-Inspired Solar Energy Meeting, Toronto (CA)		2018
American Physics Society March Meeting, Los Angeles (USA)		2018
American Chemical Society Spring Meeting, New Orleans (USA)		2018
Dept. of Physics and Astronomy, VU University, Amsterdam (NL)	Invited	2017
Eastern Regional Photosynthesis, Woods Hole (USA)		2017
Dept. of Physics, University of Cyprus, Latsia (CY)	Invited	2017
Center for Quantum Bio-Sciences, Ulm (DE)	Invited	2017
Center for Excitonics, Annual meeting, Boston (USA)		2017
American Chemical Society Fall Meeting, Philadelphia (USA)		2016
Bio-Inspired Solar Energy Meeting, Vancouver (CA)		2016
Center for Excitonics, Annual meeting, Boston (USA)		2016

Quantum Simulators of Complex Molecular Networks, Oxford (UK)		2016
Bio-Inspired Solar Energy Meeting, Montreal (CA)		2016
Photosynthesis Gordon Research Conference, Boston (USA)	Invited	2015
IMHC, Dow Chemical Company, Midland (USA)	Invited	2013

SMU Courses Taught

- **Graduate Quantum Mechanics** — Fall 2020, Fall 2021, Fall2022
- **General Chemistry I** — Spring 2021, Spring 2022

Conference Organization

Eastern Regional Photosynthesis Conference (2022/2023)

- The Eastern Regional photosynthesis conference is a long standing 3-day conference with 50-100 attendees focused on research in photosynthesis, broadly conceived. In addition to developing symposium sessions and inviting speakers, I was involved in fundraising to support reduced graduate student and post-doc rates for attendance.
- 2022: Vice-Chair of the 39th annual ERPC
- 2023: Chair of the 40th annual ERPC

Coherent Multidimensional Spectroscopy Conference (2022)

- Local Organizing Committee: I'm serving as part of the local organizing committee for this international conference (Organizers: Sean Roberts (UT Austin) and Carlos Biaz (UT Austin)) focused on non-linear spectroscopy with approximately 200 anticipated attendees.

Service & Leadership

Grant Reviewer

- DOE, external reviewer
- NSF, Panel Reviewer
- UK- BBSRC, external reviewer
- PSC CUNY
- CECAM

Manuscript Reviewer

- Nature Communications
- Journal of the American Chemical Society
- Journal of Physical Chemistry Letters
- Chemical Science
- Biophysical Journal
- Physical Review X
- Physical Chemistry Chemical Physics
- BBA - Bioenergetics
- Photosynthesis Research
- Frontiers
- Quantum Science and Technology

Guest Editor

- Frontiers in Chemistry (2020)