

CURRICULUM VITAE

Professor Steven Prawer

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QUALIFICATIONS:

- BSc (1st class Honours), Monash University, 1980, Double Major: Physics and Computing
- Academic Record: High Distinctions were obtained for every subject undertaken for the degree. Dux of the 1980 Honours year of 17 Honours students.
- PhD, 1985, Monash University, "Elastic, Dielectric and Thermal Expansion Properties of CsH₂PO₄". Supervisor: Professor T.F. Smith
- DSc. 1997, University of Melbourne, "Synthesis, Characterization and Modification of Carbon Allotropes".

PRIZES AND AWARDS:

- Vera Moore Junior Research Fellowship; awarded to the most promising scholar in the University to undertake a PhD degree.
- John J. McNeill Prize in Physics; awarded to the top class I Honours Student in the Department of Physics at Monash University.
- CSIRO Postdoctoral Fellowship, 1985-87.
- Fulbright Senior Fellowship, March-December 1995.
- David Syme Research Prize, awarded in 1995 and presented in 1996.
- Lady Davis Visiting Professorship, 2001
- Australian Institute of Physics Youth Lecturer, 2001

POSITIONS HELD:

2002- present	Professor, School of Physics, The University of Melbourne Program Manager, Centre of Excellence for Quantum Computer Technology
2002-2007	Associate Director and Chair, Physical Sciences Panel, Nanostructural Analysis Network Organization (NANO)
2000-2002:	Director, Melbourne Node of the Special Research Centre for Quantum Computing Technology
1996-2002:	Associate Professor and Reader, School of Physics, University of Melbourne
1992-1995:	Senior Lecturer, School of Physics, The University of Melbourne
1991:	Tenured Lecturer, School of Physics, The University of Melbourne
1988-1990:	Senior Lecturer, Department of Applied Physics and Microelectronics and Materials Research Centre, Royal Melbourne Institute of Technology
1987-1988:	Lecturer, Department of Applied Physics, Royal Melbourne Institute of Technology
1985-1987:	Postdoctoral Fellow at The Technion, Haifa, Israel, and the C.S.I.R.O. Division of Materials Science and Technology
1981-1985:	Tutor, Physics and Mathematics (1st Year University) whilst enrolled as a PhD Student.

VISITING POSITIONS:

Nov 2003	Visiting Professor, Nanyang University of Technology
Jan-June 2002	Visiting Professor, School of Electrical Engineering, The Technion, Haifa, Israel
May 1998	Visiting Professor, Solid State Institute, The Technion, Haifa, Israel.
June 1997	Visiting Professor, Microelectronics Center and Department of Electrical Engineering, The Technion, Haifa, Israel.
June 1996	Visiting Professor, Solid State Institute, The Technion, Haifa, Israel
Oct 1995 - Dec 1995:	Visiting Professor, Dept. of Physics, Massachusetts Institute of Technology, Cambridge, MA.
April 1995 - Aug 1995:	Visiting Scientist, Naval Research Laboratories, Washington DC, USA.
Dec 1994 - March 1995:	Visiting Professor, Solid State Institute, Technion, Haifa, Israel.
Dec 1989 - Feb 1990:	Visiting Senior Research Scientist, Solid State Institute, The Technion, Haifa, Israel.

CAREER SUMMARY:

Steven Prawer was born in Melbourne, on 31 January 1958 and was educated at Monash University where he gained the degree of BSc (Hons) in 1980 graduating dux of his class. He was the inaugural recipient of the John J. McNeil prize in Physics and the Vera Moore Junior Research Fellowship for the duration of his Ph.D which was awarded by Monash University in 1985. His awards include: the CSIRO postdoctoral fellowship (1985-86), the Fulbright senior Fellowship (1995), the David Syme Research prize (1996) and the Lady Davis Visiting Professorship (2002), in addition to holding visiting positions at MIT (USA), The Technion (Israel) and NTU (Singapore). He gained the degree of Doctor of Science from the University of Melbourne in 1998.

Professor Prawer commenced his career as a CSIRO postdoctoral fellow at the Technion, Israel in 1985 and later at the CSIRO Division of Materials Science and Technology. In 1987 he was appointed as a lecturer in the School of Applied Physics at RMIT. In 1990 he took up a lectureship in the School of Physics at the University of Melbourne. He was promoted to senior lecturer in 1992 and in 1996 to the position of Associate Professor and Reader. In 2000, he became the director of the Melbourne node of the Special Research Centre for Quantum Computer Technology and in 2002 was promoted to full Professor.

Professor Prawer is Australia's foremost authority on the physics of diamond and related materials. Specifically, he has elucidated the interaction of ion beams with carbon based materials and in so doing has made a significant contribution to our understanding of defects in diamond. These studies are part of a world wide effort to exploit diamond as a high performance semiconductor in harsh, high-power, high radiation environments and more recently to take advantage of the unique properties of colour centres in diamond to make quantum devices. He is a leader in the use of Raman spectroscopy for the analysis of diamond and amorphous carbon materials and has provided clarity and insight into the use of this technique for the analysis of carbons. Most recently, he has shown how it is possible to turn carbon directly into diamond using a solid state reaction without the need for high pressure or plasma treatments. This allows the production of diamond quantum dots which show great promise for applications in quantum communications and quantum computing.

Professor Prawer has published over 170 refereed papers in international journals. His work has been cited over 1700 times in the past ten years and he is a much sought after lecturer at international conferences and serves on many international committees. In 2002, he was the chair of highly successful Eighth International Conference on New Diamond Science and Technology, held at the University of Melbourne and was recently elected to the editorial board of the journal 'Diamond and Related Materials'.

In 2000 he spearheaded the University of Melbourne's entry into the world of quantum computing and Nanotechnology becoming the inaugural director of the Melbourne node of the special research center for quantum computer technology. Under his directorship the node has grown rapidly; it now encompasses four large research programs. New clean room laboratories and state-of-the-art facilities have been constructed. He has been enormously successful in attracting large research grants to the University; funding in 2001 exceeded \$1.7M and has continued at this level ever since. In 2001 he championed the University of Melbourne's participation in a Major National Research Facility (MNRF) entitled NANO: the Nanostructural Analysis Network Organization. These initiatives place the University of Melbourne in a premier position to take a leading role in the Nanotechnology revolution. Most recently, he paired with Dr Shane Huntington to establish Quantum Communications Victoria, a joint venture supported by the Victorian Government with an initial grant of \$3.3M to develop a commercially viable single photon source based on diamond. Such a source is the missing critical element in realizing absolutely secure communications that are protected from eavesdropping by the fundamental laws of quantum mechanics. In 2005, he won a competitive grant (\$1.2M) from the USA Army Research office to further develop the base technologies for a diamond quantum computer.

Professor Prawer has a special talent for teaching physics to non-specialists and in 2001 was the Australian Institute of Physics Youth Lecturer. He is also a committed to postgraduate education, and has supervised fourteen Ph.D. and Masters students to completion, and presently supervises 8 higher degree students. His commitment to the profession extends beyond Australian shores; he has acted as a consultant for the Thai government under the Thai-Australia Science engineering assistance project and has championed strong links scientific links with Israel via the Australia-Israel Scientific exchange foundation of which he is a trustee. Under his leadership, a \$300,000 grant was obtained from the Pratt foundation to create Australia-Israel fellowships under the ARC linkage international scheme. This is believed to be the first instance of a partnership of this kind between the ARC and a philanthropic organization.

Professor Prawer's most recent work has been dedicated to the realization of unique quantum devices based on diamond which is based on the realization that diamond possesses unique quantum properties such as the ability to read out a single spin at room temperature. The enterprise to construct practical diamond quantum devices is firmly based on the extensive and fundamental work Professor Prawer performed in the 1990s to understand the interaction of energetic ions with diamond and diamond-like materials and the tools he developed to analyse these materials.

In summary, Professor Prawer is one of Australia's pre-eminent materials physicists who is championing the application of his knowledge base to the emerging field of Nanotechnology. His research collaborations stretch from the USA to Israel, Thailand, and Singapore. His publications and international reputation have helped establish the University of Melbourne as a center of excellence for diamond based research. His has and will continue to play a pivotal role in the Nanotechnology revolution.

HIGHER DEGREE SUPERVISION:

10 PhD, 4 Masters, and 5 Honours theses completed.

6 Ph.D theses in progress.

MAJOR RESEARCH GRANTS 1998-present:

Grant	Source	Years	Total funding (,000K)
<i>Innovations in the Synthesis, Annealing and Applications of Diamond (with D. Jamieson)</i>	ARC	1998-2000	226
<i>Advanced Materials Characterization Using Scanning Probe Microscopies (with T. Finlayson)</i>	ARC RIEFP	1998	660
<i>Pulsed Laser Deposition of Advanced Materials</i>	ARC (RIEFP)	1999	820
<i>Scanning Probe Microscopy of Electron Emitting Diamond Surfaces</i>	ARC	1999-2001	260
<i>Diamond Quantum Dots Fabricated by Ion implantation</i>	ARC	2003-2005	290
<i>Special Research Center for Quantum Computer Technology: (Melbourne Node) led by Clark et al</i>	ARC (SRC)	2000-2002	1,100 (Melb node component)
<i>Centre of Excellence for Quantum Computer Technology (led by Clark et al)</i>	ARC (COE)	2003-2007	14M total funding, Melbourne node: 5M
<i>New Ways of Seeing: Raman and Infrared Microscopy</i>	ARC (LIEF)	2001	1,230
<i>Quantum Communications Victoria (with Huntington and Hollenberg)</i>	Victorian Government (STI)	2005-2007	3,330
<i>Quantum Computing in Diamond</i>	Army Research Office (USA)	2005-2007	1,200
<i>Nanostructural Analysis Network Organization</i>	Major National Research Facility	2002-2006	11,500 total, Melbourne node: 870
<i>Carbon Nanocomposite as electron source in vacuum microelectronics (led by D. Lau)</i>	A-STAR (Singapore)	2003-2005	160
<i>Engineered Quantum Information in Nanostructured Diamond</i>	EU (sixth framework) and DEST	2007-2010	450
<i>Critical Components for Ultrasecure Communication</i>	DEST	2006-2008	550
<i>Optical Information Processing with Diamond</i>	ARC	2007-2009	910

MEMBERSHIPS OF PROFESSIONAL ORGANIZATIONS:

- Member, Australian Institute of Physics.
- Member, Materials Research Society.
- Member, Australian Vacuum Society
- Committee Member, Australian Technion Society.
- Trustee, Australia-Israel Scientific Exchange Foundation.

EDITORIAL BOARDS

2002 – present Associate Editor, *Diamond and Related Materials*.

MEMBERSHIPS OF ADVISORY PANELS FOR INTERNATIONAL CONFERENCES

2005- Member International Program Committee, Diamond, 2003, 2004, 2005, 2006, 2007

Member, International Advisory Committee, CIMTEC, 2006

2002: Member, Program Committee, Diamond 2002

Member, International Advisory Committee, International Symposium on Detonation Nanodiamonds: Technology, Properties and Applications, St Petersburg, July 7-9, (2003).

2001: Member, Program Committee, Diamond 2001

2000: Chair, 8th International Conference on New Diamond Science and Technology

Member, Program Committee, Diamond 2000

1999: Member, Program Committee, Diamond 99, September, 1999

Member, Program Committee, 7th International Conference on New Diamond Science and Technology, Hong Kong, , July, 2000

Member, Advisory Panel for Taiwan Diamond 2000.

1998: Member, Advisory Committee Symposium IV, CIMTEC 98: 9th International Conference On Modern Materials, and Technologies, Florence, June, 1998

Member, Program Committee, 6th International Conference on New Diamond Science and Technology, Pretoria, September, 1998

Member, Program Committee, Diamond 98, Crete, September, 1998

Member, Organizing Committee, 3rd Australian Conference on Vibrational Spectroscopy, October, 1998

1997: Member, Program Committee, Diamond 97, Edinburgh, August, 1997

1995 Member, Scientific advisory committee of the International Ion Beam Modification of Materials Meeting, Canberra, Feb., 1995

CONSULTING

- Argyle Diamond Sales Pty. Ltd.,
- CRA - Advanced Technical Development.
- The Royal Children's Hospital, Department of Otolaryngology,
- CRESTEL Pty. Ltd.,
- Future Enterprises Pty. Ltd.
- Thai-Australia Science and Engineering Assistance Project
- QPSX
- Office of fair trading.
- Canon (Inc)

REVIEWING

- Journal of Materials Research
- Thin Solid Films
- Diamond and Related Materials
- Applied Physics Letters
- Journal of Applied Physics
- Journal of Crystal Growth
- Physical Review Letters and Physical Review A and B.
- Surface Science
- The Australian Research Council
- Singapore Research Council

- Nanoletters
- IOP journals

APPEARANCES IN THE PUBLIC MEDIA:

- *When Physics Meets the Artful Dodger*, Uni News, 1999.
- *Race to break the Cyber Speed Limit*, 'The Age', March 7, 2000, page 3 of IT section.
- Interviewed on radio national 'Breakfast', about the Quantum Computer, 23 March, 2000.

INVITED LECTURES AT INTERNATIONAL CONFERENCES

(NB: Items marked with a star are those presentations for which full or partial financial support was provided.)

1. *Praver, S. - "Strain in Diamond Films and Ion Implanted Diamond", Gordon Conference on Diamond Films, Plymouth State College, New Hampshire, 20-24 June 1994.
2. *Praver, S. - "Ion Implantation of Diamond", Diamond Films '94, Il Ciocio, Italy, 25-30 September 1994.
3. *Praver, S., "Lattice substitution of Phosphorous in MeV implanted diamond", Japanese workshop on diamond electronics, Osaka University, March 11, (1996)
4. Praver, S., "Raman Characterization of Amorphous and Nanocrystalline sp^3 Bonded Structures", 1st Specialist meeting on Amorphous Carbon, (SMAC), Cambridge University, July 31-Aug 1, 1997.
5. *Praver, S., "What is the best way to try and make C_3N_4 ?", International Union of Materials Research Societies, 4th international conference, Japan, Sept 16-18, (1997).
6. *Praver, S., "Effective Activation of Dopants Using MeV Ion Implantation", Second Symposium On Diamond Electronics, Osaka, March, (1998).
7. *Praver S., " Raman Characterization of Diamond and DLC: New Insights", CIMTEC 98, 9th International Conference on Modern Materials and Technologies, Florence, June, (1998).
8. *Praver S., "Doping of Diamond By Ion Implantation", Sixth International Conference on New Diamond Science and Technology, Pretoria, South Africa, 31August-4 September, (1998)
9. Praver, S. "Thermal Stability and Relaxation in DLC: A Raman study of films with different sp^3 fractions", 2st Specialist meeting on Amorphous Carbon, (SMAC), Crown Prince Hotel, Singapore, July 14-16, 1999.
10. *Praver, S., " The Use and Abuse of Raman Spectroscopy in the Analysis of Diamond and Diamond-Like Carbon Films, Seventh International Conference on new Diamond Science and Technology, City University Hong Kong, 24-28 July, 2000.
11. *Praver., S., Field Emission from Boron Doped Polycrystalline Diamond Films with Nanometer Resolution within grains. Taiwan Diamond 2000, July31-August 1, (2000)
12. *Praver, S, MeV Ion Beam Doping of Diamond, Materials Research Society, Boston, USA, 2000
13. *Praver, S., Diamond Quantum Dots Fabricated by Ion Implantation, International Conference on Materials for Advanced Technologies, Singapore, July 2-8, (2001)
14. *Praver, S., Diamond Quantum Dots Fabricated by Ion Implantation, Diamond 2001, Budapest, Sept 3-7, (2001)
15. *Praver S., Diamond Quantum Dots Fabricated by Ion Implantation, The Ninth International Conference on Advanced Materials, Tskuba, March 3-7, 2002
16. *Praver, S., Keynote lecture: Insights into Nanocrystalline Diamond and Tetrahedral Amorphous Carbon, Progress in Advanced Materials, Khon Kean Thailand, Sept 16-18, 2002.
17. *Praver, S. Diamond Quantum Dots: Fabrication and Applications, International Frontiers of Science and Technology, 2003 Sir mark Olipant Conference, Scaling Down to the Nano-Materials World, University of Melbourne, Dec 1-4, 2003.
18. *Praver, S. and Greentree, A, 'On the role of diamond in a solid state quantum computer', Surface and Bulk Defects in CVD Diamond Films, Hasselt, Belgium, February 18-20, 2004.
19. *Praver, S., Electronic Raman Scattering of Donor Atoms in Silicon: Applications to Quantum Computing, XIX International Conference on Raman Spectroscopy, Gold Coast, Australia, 8-13 August, 2004
20. *Praver, S, 'Diamond for Quantum Communications, Spintronics and Quantum Computing, 3rd International Conference on Materials for Advanced Technologies (ICMAT 2005), Singapore, 3-8 July, 2005.
21. *Praver, S., 'Diamond Based Quantum Information Processing, Nanosingapore, Jan 10-13, 2006.
22. *Praver, S., 'Diamond Based Quantum Information Processing, Sir Mark Oliphant Conference on Quantum Nanoscience, Noosa, Australia, 21-26 Jan 2006.

23. *Praver, S., 'Diamond Based Quantum Information Processing, International Conference on New Diamond Science and Technology and Applied Diamond Conference, Rayleigh, North Carolina, May 15-18, (2006)
24. *Praver S., 'Quantum Mechanical Approaches to Information Processing', Keynote lecture, International Conference on Supercomputing, Cairns, June 28-July 1, (2006).

Other Overseas Presentations:

1. *Praver, S. - "Exploding Buckyballs", Naval Research Laboratories, Washington DC, USA, 29 June 1994.
2. *Praver, S. - "Ion Implantation into Diamond", Department of Physics, Heriott-Watt University, United Kingdom, 6 April 1995.
3. *Praver, S., "Ion Implantation into Diamond and Diamond Films", Solid State Division, Oak Ridge National Laboratory, Dec, 1995.

Australian Public Presentations:

1. *Praver, S. - "Structural Investigation of Ion Beam Modified Glassy Carbon", invited lecture at the Workshop on Analytical Electron Microscopy, Sydney University, May 1987.
2. Praver, S. - "Synthesis and Characterization of Plasma Deposited Diamond Thin Films", University of Melbourne, School of Physics Colloquium, July 1990.
3. Praver, S. - "Diamonds and Diamond Films", Institute of Metals and Materials Australasia, Melbourne, 12 March 1992.
4. Praver, S. - "Diamonds are Forever", Dean's Lecture Series, University of Melbourne, 25 August 1992
5. *Praver, S. - "The Wonderful World of Diamonds", Flinders University, November 1992.
6. *Praver, S. - "Diamonds and Diamond Films", University of New South Wales, April 1993.
7. *Praver, S. - "The Wonderful World of Diamonds", University of Sydney, July 1993.
8. Praver, S. – "Diamonds are Forever", Presentation to the Friends of the Technion, May 9, 1993.
9. *Praver, S., "The Wonderful world of Carbon", Australian National University Summer School on the Physics of Novel Materials, Canberra, January, 1997.
10. Praver S, "Diamonds: A Physicist's best friend", Oration at the Physics Teachers Conference, 14 Feb., 1997.
11. Praver, S, "The Physics of Diamond", Latrobe University Physics Colloquium, 14 May, 1997.
12. *Praver, S. "AFM and STM studies of Diamond Surfaces", Australian-German Workshop on Surface and Electrochemical Analysis, Perth, 23 September, 1998
13. Praver S., "What is Success in Research", Keynote address, 1999 Computer Science and Software Engineering Symposium, Feb 10-12th 1999, Phillip Island
14. Praver, S., "Diamond, Blue Lasers and Quantum Computers, Department of Materials Science, Monash University, Nov 29, 1999.
15. Praver S., "Introduction to the Capabilities of Raman and AFM Techniques in Solving Materials Problems", Industrial Problem Solving Using Surface and Materials Analysis: Latrobe University, 27 Oct 1999.
16. Praver S., Introduction to the Capabilities of Raman and AFM Techniques in Solving Materials Problems", Microscopy and MicroAnalysis of Engineering Materials, Monash University, 14-17 Feb, 2000.
17. Praver S., Diamond and Blue Lasers, 14th National Congress of the Australian Institute of Physics, Adelaide, 10-15 December, (2000)
18. Praver, S., From Quantum Computers to Nanofabrication, Keynote address to Physics Teachers Conference, Monash University, Clayton, Feb 9, 2001.
19. Praver, S., What is success in research? Keynote lecture delivered at the opening of the Dental School Research Symposium, University of Melbourne, August 15, 2002
20. *Praver, S. The Silicon Quantum Computer: Whats all the fuss about? Physics in context, University of Melbourne, Nov 14, 2002
21. *Praver, S., *Quantum Computing: A new paradigm for computing*, International Institute of Future Science and Culture guest lecture, University of Melbourne, Nov 11, 2002.
22. *Praver, S. *From Diamond to Quantum Computers and back Again*, Dean's Centenary Lecture, Oct 15, 2004 University of Melbourne.
23. *Praver, S, *The Diamond Quantum Computer*, School of Physics Colloquium, Nov 8, 2006, University of Melbourne