P. G. MARTIN CURRICULUM VITAE APRIL 2011

A. Biographical Information

1. Personal

Name: Peter Gordon Martin

Date of Birth: 19/09/1947

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Spouse: Camilla J. Geary-Martin. Children: Nicholas (01/81), Adrian (04/83), Taylor (09/85), Rosemary (05/89).

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2. Degrees

B. Sc.	1968	Math. and Physics	Arts and Science	U. of Toronto
M. Sc.	1969	Astrophysics	Astronomy	U. of Toronto
Ph. D.	1972	Astrophysics	Applied Mathematics and Theoretical Physics	U. of Cambridge

Ph. D. Thesis: On the Composition and Alignment of Interstellar Grains

Ph. D. Supervisors: Dennis W. Sciama and Martin J. Rees

3. Employment

Present, at University of Toronto

Professor, Canadian Institute for Theoretical Astrophysics (CITA)

History, at University of Toronto

Appointed Assistant Professor, 1972; to Graduate School, 1973; tenure awarded and promoted to Associate Professor, 1976; promoted to Professor, 1980; first faculty member of CITA, 1984; Chair of Astronomy and Astrophysics, 1999–2010; Director of DDO, 1999–2008; Interim Director, Dunlap Institute for Astronomy and Astrophysics, 2008–10.

Other Academic Appointments (reverse chronology)

2007, 04–05	Professeur invité	Institut d'Astrophysique Spatiale	U. Paris Sud
2002, 03–04	Professeur invité	Institut d'Astrophysique Spatiale	U. Paris Sud
2002, 01–06	Visiting Associate	Theoretical Astrophysics	Caltech
2002, 01–06	Distinguished Visit. Scientist	IPAC	Jet Propulsion Laboratory, Caltech
2001, 09-12	Distinguished Visit. Scientist	Long Wave. Ctr. Excellence	JPL
1999	Associate Director	Canadian Institute for Theoretical Astrophysics	U. of Toronto
1992-93	Visiting Associate	Theoretical Astrophysics	Caltech
1992-93	Guest Investigator	IPAC	JPL
1989	Acting Director	Canadian Institute for Theoretical Astrophysics	U. of Toronto
1986-87	Visiting Professor	Lick Observatory	U. C. Santa Cruz
1984-85	Acting Director	Canadian Institute for Theoretical Astrophysics	U. of Toronto
1978-79	Senior Visiting Fellow	Institute of Astronomy and Churchill College	U. of Cambridge
1978-79	Visiting Professor	Steward Observatory	U. of Arizona

Prehistoric Teaching and Research Experience (reverse chronology)

1969-71	Computing lab. instructor	Applied Mathematics	U. of Cambridge
1968-69	Laboratory instructor	Astronomy	U. of Toronto
1967-68	Marker	Physics	U. of Toronto
1966-68	Tutor	Mathematics	U. of Toronto
1967	Research assistant (summer)	Radio astronomy	NRC, Ottawa
1966	Research assistant (summer)	Upper atmos. physics	NRC, Ottawa

4. Awards, Honours

2007	Fellow, Royal Society of Canada
2006-08	President, Canadian Astronomical Society
2003–	Member of the Corporation, Massey College, University of Toronto
1999–	Senior Fellow, Massey College, University of Toronto
1994	C.S. Beals Award (outstanding achievement in research), Canadian Astronomical Society
1972	NATO postdoctoral fellowship (declined)
1969-72	Commonwealth Scholar (University of Cambridge)
1969	NRC postgraduate scholarship (declined)
1968-69	NRC postgraduate scholar
1968	Gold Medal of the Royal Astronomical Society of Canada
1968	Janes Silver Medal

B. Academic History

6a. Research Endeavours – current

My work is on interstellar matter and its relationship to stellar evolution (the birth of stars and planets, nucleosynthesis of the elements in stars, and the death of stars). Although we now know that ultimately we derive from diffuse dust and gas in the interstellar medium (ISM) in the Galactic plane, many details are still shrouded in mystery whose resolution requires a comprehensive understanding of the Galactic ecosystem, where counterbalancing, often violent, forces have shaped the ISM and star formation within it over the aeons. I would like to understand from first principles the entire ISM cycle – wispy cirrus, clumpy molecular clouds, star formation, disruption – and progress is palpable. My research program has thrusts designed to illuminate several stages of this cycle, spanning dust evolution to star formation, and including key but elusive transitional states like when diffuse gas first passes from atomic to molecular form, and the cold dense molecular cores just before gravitational collapse.

A wealth of new observations is streaming in worldwide from ground- and space-based telescopes. I have been engaged in a wide variety of fascinating projects, mixing theory and observations, aimed at understanding interconnected aspects of the Galactic ecosystem. My research includes theoretical work understanding basic physical processes, incorporating them in astrophysical simulations, and analysis and interpretation of strategically-acquired data. Through my own efforts and initiative, I believe that I have both influenced and enabled new directions of ISM research and produced products of significant value to end users.

Much of my work now relies on space astronomy and so I am working hard to ensure the success of science with the CSA-supported missions Herschel (HSO: SPIRE and HIFI), Planck (HFI), and JWST (NIRCam). I am also taking advantage of ground-based telescopes, such as the Green Bank Telescope, the DRAO Synthesis Telescope, and the new SCUBA2 on JCMT.

• The Herschel Space Observatory (HSO; launched May 2009) is a far-infrared observatory for imaging (SPIRE) and high-resolution spectroscopy (HIFI). I am work with the international Science Teams of both HIFI and SPIRE (one of four Canadian members) for our guaranteed time observations. My interests are in interstellar molecules and atomic fine structure lines for the former, HIFI, with our major survey of Orion, and detailed examinations of the physical processes in photodissociation regions and diffuse clouds. Our current programs with SPIRE are on dust evolution and earliest precursors to star formation.

• Planck is an ESA-led survey mission (launched with HSO) to study fluctuations in the cosmic microwave background (CMB), but in the course of its all-sky mapping it is providing unprecedented information on the Galaxy, including polarization, complementary to our Galactic Plane Surveys. I am an Associate Investigator for the Planck HFI instruments (one of two members for Canada) participating actively in (now co-coordinating) WG7 (Galactic and Solar System Science) concentrating on characterizing foreground high Galactic latitude emission.

• The James Webb Space Telescope (JWST) is to be launched in 2015 as the successor to the Hubble Space Telescope, funded by NASA, ESA, and the CSA. It will concentrate on near to mid infrared imaging and spectroscopy. I participate within the international Science Team (one of three Canadian members) for NIRCam (the premier instrument around which JWST is being designed).

• The DRAO Synthesis Telescope (DRAO/ST) near Penticton is being used for wide-area high-resolution surveys of atomic, ionized, and relativistic gas in the interstellar medium.

We have used about 80% of the time (24/7) since 1995. Recently we have added more sensitive receivers and arranged ground screening to enable us to observe faint fields to much higher sensitivity. I have become very interested in high latitude clouds and so I developed this thrust for what has become our most recent project there, the "DRAO Planck Deep Fields".

• The Green Bank Telescope (GBT) is a new-generation 100-m radio telescope superbly equipped to make observations of faint emission from atomic hydrogen. I have been exploiting this to understand better the foreground dust emission that will contaminate Planck observations of the CMB. Our work has extended to emission from the so-called intermediate velocity and high-velocity clouds (the latter, extragalactic material falling in) which are seen prominently at high Galactic latitudes.

• The James Clerk Maxwell Telescope (JCMT) in Hawaii is the world's premier mm-wave observatory. Coming on line for routine observations in late 2011 is a powerful new camera, SCUBA2. I am active in an international team that has been awarded time for a Legacy project that we call the JCMT Galactic Plane Survey (JPS).

Here I describe just a few of the projects.

• Massive Stars and the Interstellar Medium (ISM). I have been principally concerned with using our multifrequency Canadian Galactic Plane Survey (CGPS) data to probe the disruptive influence of young stars on the surrounding medium. Compared to infrared images of star forming regions, submillimetre observations can reveal colder clouds of dust (and gas) in the earliest stages of pre-stellar collapse. With JCMT/SCUBA observations of the KR 140 region, we have discovered a number of relatively cold submillimetre sources not visible in the IRAS data. These cold cores are very important as they represent the earliest stages of star formation. Interestingly, not all stars in this region form at the same time. Several of the submillimetre sources are found at the H II – molecular gas interface and have probably been formed as the result of expansion of the H II region (triggered star formation). Star formation was a major theme for our Galactic plane surveys with BLAST and is still with our current ones with SPIRE and the James Clerk Maxwell Telescope; we are discovering and characterizing the very early stages of star formation, the cold dense filaments and cores hitherto undetectable.

• Evolution of Interstellar Dust. Key dust properties, like size distribution, chemical composition, and alignment, which produces polarization, show remarkable changes in different phases of the ISM. A new method of examining the evolution of dust is through its far-infrared and submillimetre emission, since different dust components have characteristic spectral emissivities. We are now able to separate these using multifrequency imaging obtained in our observations with SPIRE and Planck in distinctive interstellar environments. Planck has mapped the whole sky, producing an unprecedented view of Galactic dust, including an elusive cold component seen in some recent observations. Polarization is an interesting new tool which we hope to exploit. I have made theoretical predictions of the sub-mm polarization which agree well with observations by Archeops. To obtain better resolution than can be obtained with all-sky surveys, we are making dedicated Galactic Plane surveys with JCMT/SCUBA2, and Herschel/SPIRE Hi-GAL, for which I am Canadian lead.

• Foregrounds and Component Separation. Dust emission produces one of the unwanted foregrounds to the CMB (Boomerang and Planck) and to far-infrared searches for distant (hence seen as young) galaxies and unresolved sources using ISO, Spitzer, BLAST, and now Herschel and Planck. Among my contributions to the teams has been using sensitive mapping of atomic hydrogen as a calibrated surrogate of the dust emission, to subtract the foreground both directly and in the power spectrum. I have just finished a large program to map HI in the very faintest regions of the sky. Although very challenging,

this has been very successful, mapping over 800 sq. degrees to unprecedented sensitivity with the 100-m GBT at NRAO. We are now busy comparing the HI spectral images with various far-infrared images (IRAS, Spitzer, HSO, and Planck) to determine new foreground contributions from intermediate and high velocity clouds. I have extended this work to higher angular resolution in the DRAO Planck Deep Fields, obtaining spectacular results relevant to the dynamical origin of structure in these clouds.

Other Work

• *Computational astrophysics.* A central tool in my research is the computer, the main demands being for various extensive simulations of astrophysical phenomena. I was an early proponent of parallel computing, installing a dedicated 20-node cluster of Alpha computers. I led several national consortium of Canadian astrophysicists in obtaining major grants for a large compute servers. We built a remarkable parallel machine which was at the time (2003) 38th fastest in the world (fastest in Canada by far) and yet relatively inexpensive ($900K). This placed CITA in a key leadership position within the present university-wide high-performance computing consortium, SciNet, that I helped nurture into national prominence. The installation created from the most recent award of $30M is quite awesome.

• *Observations.* Over the years I have been engaged in a considerable amount of observational work to acquire data relevant to the largely theoretical projects that I have carried out. A summary of telescope time awarded in international competitions is in §6c. As well as directly aiding my research, this observing has added depth and flexibility to my ability to supervise graduate students and research associates.

My original area of observing expertise was optical polarimetry. The observations have been carried out using the large telescopes of the University of Texas, the University of Arizona, and the Kitt Peak National Observatory. This has led to efforts in infrared polarimetry at UKIRT and ultraviolet polarimetry with the Hubble Space Telescope.

I have made observations, often collaboratively, in the ultraviolet with the IUE, FUSE, and Hubble satellites, in the optical with the Canada-France-Hawaii (CFHT), Kitt Peak, CTIO, DDO, DAO, and Las Campanas telescopes, in the submillimetre with BLAST and SCUBA at JCMT, in the millimetre with the Caltech millimeter wave array at Owens Valley and MUSTANG on the GBT, and in the radio with the 26-m and synthesis telescopes of the Dominion Radio Astronomy Observatory, and the VLA and the GBT of NRAO.

As mentioned above I am presently carrying out investigations with HSO and Planck and have plans for JCMT/SCUBA2 and JWST/NIRCam.

6b. Recent Research Awards

Research Grants (Amounts in K$Cdn)

2010-13	CSA SSEP – Planck/Herschel Dust (PI)	200
2010-13	CSA SSEP – Herschel Star Formation (PI)	200
2008-13	NSERC Discovery (PI)	344
2007-10	CSA SSEP – BLAST05 (PI)	150
2007-12	NSERC Institute – CITA (Co-I)	5,500
2006-10	NSERC SRO – TMT Detailed Design (Co-I)	6,000
2006-08	CSA – BLAST 2nd science flight (Co-I)	430
2005-09	NSERC SRO – DRAO Planck Deep Fields (Co-I)	848
2003-06	NSERC CSA – Planck Science (Co-I)	270
2003-08	NSERC Discovery (PI)	300

Infrastructure and Equipment Grants (Amounts in K$Cdn)

2007	NSERC RTI – OH suppression (Co-I)	80
2006	NSERC RTI – BLAST refurbishment (Co-I)	80
2005-08	NASA – BLAST and BLASTpol (Co-I)	2,205

6c. Time allocations at major ground and space-based observatories

These allocations were awarded through peer-reviewed international competition.

Past

Kitt Peak National Observatory (KPNO)
University of Texas, McDonald Observatory
University of Arizona (Steward Observatory and Catalina station)
Canada-France-Hawaii Telescope (CFHT)
Cerro Tololo Interamerican Observatory (CTIO)
International Ultraviolet Explorer (IUE)
James Clerk Maxwell Telescope (JCMT)
UK Infrared Telescope (UKIRT)
Hubble Space Telescope (HST)
ROSAT
Owens Valley Radio Observatory (OVRO)
Very Large Array (NRAO)
Far Ultraviolet Explorer (FUSE)

Recent allocations (2005–08)

Dominion Radio Astrophysical Observatory (DRAO) – Int'l Galactic Plane Survey
Green Bank Telescope (GBT) – Planck Deep Fields
GBT – HI surveys of High Velocity Clouds
GBT – HI surveys of Intermediate Velocity Clouds
GBT – North Ecliptic Pole survey
GBT – MUSTANG observations of Orion
Spitzer Space Telescope – MIPSGAL Galactic plane survey
DRAO – Planck Deep Fields

Active allocations (2009–)

Herschel Space Observatory (HSO) – Gould Belt Survey
HSO – High Mass Star Formation
HSO – Evolution of Dust
HSO – HiGAL: Survey of Galactic Plane, and Hi-GAL 360
HSO – Dust Evolution in the Spider
HSO – Spectroscopy of Interstellar Molecules
Planck – 7 core science projects on the interstellar medium
HSO and Planck – Cold Cores

C. Scholarly and Professional Work

7a. Refereed Publications

1

Martin, P. G. *A Study of the Structure of Rapidly Rotating Close Binary Systems*, Astrophysics and Space Science, **7**, 119-138, 1970.

Martin, P. G., & Sciama, D. W. *A Proposal for an X-ray Analysis of Interstellar Grains*, Astrophysical Letters, **5**, 193-196, 1970.

Martin, P. G. *On the Interaction of Cosmic X-rays with Interstellar Grains*, Monthly Notices of the Royal Astronomical Society, **149**, 221-235, 1970.

Martin, P. G. *On the Infrared Spectra of Interstellar Grains*, Astrophysical Letters, **7**, 193-197, 1971.

Martin, P. G. *The Ratio of Total to Selective Extinction and the Distance to the Galactic Centre*, Monthly Notices of the Royal Astronomical Society, **153**, 251-260, 1971.

Martin, P. G. *On Interstellar Grain Alignment by a Magnetic Field*, Monthly Notices of the Royal Astronomical Society, **153**, 279-285, 1971.

Martin, P. G. *On the Interaction of Rotating Interstellar Grains with Cosmic Low Frequency Radiation*, Monthly Notices of the Royal Astronomical Society, **155**, 283-291, 1971.

Martin, P. G. *Momentum Exchange Between Small Particles and Light*, Monthly Notices of the Royal Astronomical Society, **158**, 63-78, 1972.

Martin, P. G. *Interstellar Circular Polarization*, Monthly Notices of the Royal Astronomical Society, **159**, 179-190, 1972.

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Martin, P. G., Illing, R., & Angel, J. R. P. *Discovery of Interstellar Circular Polarization in the Direction of the Crab Nebula*, Monthly Notices of the Royal Astronomical Society, **159**, 191-201, 1972.

Angel, J. R. P., Illing, R. M. E., & Martin, P. G. *Circular Polarization of Twilight*, Nature, **238**, 389-390, 1972.

Illing, R. M. E., & Martin, P. G. *Scorpius X-1: A Search for Optical Circular Polarization*, Astrophysical Journal (Letters), **176**, L113-L114, 1972.

Angel, J. R. P., & Martin, P. G. *Observations of Circumstellar Circular Polarization in Four More Infrared Stars*, Astrophysical Journal (Letters), **180**, L39-L41, 1973.

Martin, P. G. *Interstellar Polarization From a Medium with Changing Grain Alignment*, Astrophysical Journal, **187**, 461-472, 1974.

Martin, P. G., & Angel, J. R. P. *A Study of Interstellar Polarization at the λ4430 and λ5780 Features in HD 183143*, Astrophysical Journal, **188**, 517-522, 1974.

Angel, J. R. P., Hintzen, P., Strittmatter, P. A., & Martin, P. G. *G240-72. A New Magnetic White Dwarf with Unusual Polarization*, Astrophysical Journal (Letters), **190**, L71-L72, 1974.

Martin, P. G., & Angel, J. R. P. *A Study of Birefringence in the Interstellar Medium in the Direction of the Crab Nebula*, Astrophysical Journal, **193**, 343-351, 1974.

Martin, P. G., & Angel, J. R. P. *The Diffuse Interstellar Features Studied in HD 21389 by Polarimetry and Spectrophotometry*, Astrophysical Journal, **195**, 379-383, 1975.

Martin, P. G. *A Semi-Empirical Formula for Interstellar Birefringence*, Astrophysical Journal, **201**, 373-376, 1975.

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Martin, P. G. *On the Kramers-Kronig Relations for Interstellar Polarization*, Astrophysical Journal, **202**, 389-392, 1975.

Martin, P. G. *Some Implications of 10-Micron Interstellar Polarization*, Astrophysical Journal, **202**, 393-399, 1975.

Angel, J. R. P., Stockman, H. S., Woolf, N. J., Beaver, E. A., & Martin, P. G. *The Origin of Optical Polarization in NGC 1068*, Astrophysical Journal (Letters), **206**, L5-L9, 1976.

Martin, P. G., & Angel, J. R. P. *Systematic Variations in the Wavelength Dependence of Interstellar Circular Polarization*, Astrophysical Journal, **207**, 126-130, 1976.

Martin, P. G., & Campbell, Bruce. *Circular Polarization Observations of the Galactic Magnetic Field*, Astrophysical Journal, **208**, 727-731, 1976.

Martin, P. G., Angel, J. R. P. , & Maza, J. *Night to Night Variations in the Optical Polarization of the Nucleus of NGC 1275*, Astrophysical Journal (Letters), **209**, L21-L23, 1976.

Martin, P. G. *The Nucleus of the Seyfert Galaxy NGC 1275*, Monthly Notices of the Royal Astronomical Society, **178**, 379-382, 1977.

Martin, P. G., Maza, J., & Angel, J. R. P. *The Polarization of Nova Vulpecula*, Nature, **265**, 314-315, 1977.

Maza, J., Martin, P. G., & Angel, J. R. P. *On the Composite Nature of the BL Lacertae Objects Markarian 421 and 501*, Astrophysical Journal, **224**, 368-374, 1978.

Crabtree, D. R., & Martin, P. G. *Circumstellar Dust Envelopes: Calculation of Eclipse Light Curves and Fringe Visibilities*, Astrophysical Journal, **227**, 900-906, 1979.

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Rogers, C., & Martin, P. G. *On the Shape of Interstellar Grains*, Astrophysical Journal, **228**, 450-464, 1979.

Thompson, I., Landstreet, J. D., Angel, J. R. P., Stockman, H. S., Woolf, N. J., Martin, P. G., Maza, J., & Beaver, E. A. *Optical Polarization of the Seyfert Galaxy NGC 4151*, Astrophysical Journal, **229**, 909-916, 1979.

Liebert, J., Angel, J. R. P., Hege, E. K., Martin, P. G., & Blair, W. P. *The Moving Emission Features in SS 433 Require a Dynamical Interpretation*, Nature, **279**, 384-387, 1979.

Martin, P. G., & Shawl, S. J. *The Wavelength Dependence of Interstellar Polarization in M31*, Astrophysical Journal (Letters), **231**, L57-L59, 1979.

Martin, P. G., & Rees, M. J. *A Model for SS 433: Precessing Jets in an Ultra-Close Binary System*, Monthly Notices of the Royal Astronomical Society, **189**, 19P-22P, 1979.

Wilking, B. A., Lebofsky, M. J., Martin, P. G., Rieke, G. H., & Kemp, J. C. *The Wavelength Dependence of Interstellar Linear Polarization*, Astrophysical Journal, **235**, 905-910, 1980.

Martin, P. G., & Ferland, G. J. *Far-UV Dust Opacity and Photoionization in QSOs*, Astrophysical Journal (Letters), **235**, L125-L128, 1980.

Murdin, P. G., Clark, D. H., & Martin, P. G. *The optical spectrum of SS 433*, Monthly Notices of the Royal Astronomical Society, **193**, 135-151, 1980.

Martin, P. G., & Shawl, S. J. *Polarization of Scattered Light in Globular Clusters*, Astrophysical Journal, **251**, 108-112, 1981.

Clayton, G. C., & Martin, P. G. *On the Intrinsic Polarization of Red Dwarfs*, Astronomical Journal, **86**, 1518-1519, 1981.

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Martin, P. G., & Shawl, S. J. *An Optical Study of the Magnetic Field in M31*, Astrophysical Journal, **253**, 86-90, 1982.

Martin, P. G., Stockman, H. S., Angel, J. R. P., Maza, J., & Beaver, E. A. *Optical Polarization of the Seyfert Galaxies IC 4329A and Mrk 376*, Astrophysical Journal, **255**, 65-69, 1982.

Moore, R., McGraw, J., Angel, J. R. P., Duerr, R., Lebofsky, M. J., Rieke, G. H., Wisniewski, W. Z., Axon, D. J., Bailey, J., Hough, J. M., Thompson, I., Breger, M., Schulz, H., Clayton, G. C., Martin, P. G., Miller, J. S., Schmidt, G. D., Africano,

J., & Miller, H. R. *The Noise of BL Lacertae*, Astrophysical Journal, **260**, 415-436, 1982.

Clayton, G. C., Martin, P. G., & Thompson, I. B. *The Wavelength dependence of Interstellar Polarization in the Large Magellanic Cloud*, Astrophysical Journal, **265**, 194-201, 1983.

Martin, P. G., Thompson, I. B., Maza, J., & Angel, J. R. P. *The Polarization of Seyfert Galaxies*, Astrophysical Journal, **266**, 470-478, 1983.

Rogers, C., Martin, P. G., & Crabtree, D. R. *The Circumstellar Dust of mu Cephei*, Astrophysical Journal, **272**, 175-181, 1983.

Martin, P. G., Rogers, C., & Rybicki, G. B. *Half-range Moment Methods for Radiative Transfer in Spherical Geometry II. Implementation of the Method*, Astrophysical Journal, **284**, 317-326, 1984.

Rogers, C., & Martin, P. G. *Half-range Moment Methods for Radiative Transfer in Spherical Geometry III. Numerical Solution and Applications*, Astrophysical Journal, **284**, 327-336, 1984.

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Dove, J. E., Rusk, A. C. M., Cribb, P. H., & Martin, P. G. *Excitation and Dissociation of Molecular Hydrogen in Shock Waves at Interstellar Densities*, Astrophysical Journal, **318**, 379-391, 1987.

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Clavel, J., ..., Martin, P. G., ... *Steps toward Determination of the Size and Structure of the Broad-line Region in Active Galactic Nuclei. I. An Eight Month Monitoring Campaign of NGC 5548 with IUE*, Astrophysical Journal, **366**, 64-81, 1991.

Baldwin, J. A., Ferland, G. J., Martin, P. G., Corbin, M. R., Cota, S. A., Peterson, B. M., & Slettebak, A. *Physical Conditions in the Orion Nebula and an Assessment of its Helium Abundance*, Astrophysical Journal, **374**, 580-609, 1991.

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Rouleau, F., & Martin, P. G. *Shape and Clustering Effects on the Optical Properties of*

Amorphous Carbon, *Astrophysical Journal,* **377**, 526-540, 1991.

Chang, C. A., & Martin, P. G. *Partially Dissociative Jump Shocks in Molecular Hydrogen*, *Astrophysical Journal,* **378**, 202-213, 1991.

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8a. Non-Refereed Publications

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Molinari, S., et al. 2010 *From Clouds to Young Stellar Objects and back again: the all-in-one view from the Herschel infrared Galactic Plane Survey*, in *38th COSPAR Scientific Assembly*, (38), pp. 2488.

Truch, M., et al. *BLAST Large-scale Extragalactic Submillimeter Survey Results*, Bulletin of the American Astronomical Society, **36**, 602.17, 2010.

Blagrave, K., et al. 2010 *Targeted deep surveys of high Galactic latitude HI with the GBT*, in *The Dynamic ISM: A celebration of the Canadian Galactic Plane Survey*, eds. (arXiv:1009.0715), pp. .

8b. Books and Book Chapters

Martin, P. G. *Cosmic Dust, Its Impact on Astronomy.* (Clarendon Press – Oxford University Press: Oxford, 1979), xiv, 266 pp., index, illus. Oxford Studies in Physics.

Martin, P. G. *Evolution of Novae: An Optical Perspective*, in *Classical Novae*, eds. M. F. Bode & A. Evans (John Wiley: New York, 1989), pp. 73-92.

Martin, P. G. *Overview of Nova DQ Her 1934*, in *Classical Novae*, eds. M. F. Bode & A. Evans (John Wiley: New York, 1989), pp. 93-111.

Martin, P. G. *Photoionization Models of the Evolution of Nova DQ Her 1934*, in *Classical Novae*, eds. M. F. Bode & A. Evans (John Wiley: New York, 1989), pp. 113-141.

8d. Abstracts (meetings attended), Bulletins and Circulars

Basically stopped this list in 1996 since it was getting too long! Some new ones are referred to under "in preparation" or as non-referred publications where relevant to recent work

Angel, J. R. P., Woolf, N. J., Martin, P. G., Beaver, E. A. *A Polarimetric Study of Four Seyfert Galaxies*, Bulletin of the American Astronomical Society, **8**, 290, 1976.

Martin, P. G., Maza, J., & Angel, J. R. P. *Nova Vulpecula*, IAU Circular, **3001**, 1976.

Martin, P. G., Murdin, P. G., & Clark, D. H. *SS 433*, IAU Circular, **3358**, 1979.

Moore, R., McGraw, J., Angel, R., Duerr, R., Lebofsky, M., Rieke, G., Wisniewski, W., Axon, D., Bailey, J., Hough, J., Breger, M., Clayton, J., Martin, P. G., Miller, J., Schmidt, G., Schulz, H., & Thompson, I. *Coordinated Worldwide Monitoring of BL Lacertae*, Bulletin of the American Astronomical Society, **12**, 808-809, 1980.

Martin, P. G. *Infrared Polarization in Molecular Clouds*, Bulletin of the American Astronomical Society, **19**, 710, 1987.

Baldwin, J. A., Ferland, G. J., Martin, P. G., Corbin, M. R., Cota, S. A., Peterson, B. M., & Slettebak, A. *Physical Conditions in the Orion Nebula and an Assessment of its Helium Abundance*, Journal of the Royal Astronomical Society of Canada, **84**, 425, 1990.

Martin, P. G., & Mandy, M. E. *Collisional Excitation of Molecular Hydrogen by Hydrogen Atoms*, Journal of the Royal Astronomical Society of Canada, **85**, 200, 1991.

Rouleau, F. & Martin, P. G. *Shape and Clustering Effects on the Optical Properties of Amorphous Carbon*, Journal of the Royal Astronomical Society of Canada, **85**, 201, 1991.

Chang, C. A., & Martin, P. G. *Partially Dissociative Jump Shocks in Molecular Hydrogen*, Journal of the Royal Astronomical Society of Canada, **85**, 207, 1991.

Martin, P. G., & Mandy, M. E. *Collisional Excitation of H_2 by H atoms*, Bulletin of the American Astronomical Society, **23**, 888, 1991.

Mandy, M. E., & Martin, P. G., 1992. *Rate Coefficients for State-to-State Transitions of $H + H_2$*, in Faraday Symposium No. 28 on Chemistry in the Interstellar Medium.

Mandy, M. E., & Martin, P. G., 1992. *Inelastic Collisions of $H + H_2$*, in Inelastic Collisions and Photodissociation for Astrophysics.

Rouleau, F., & Martin, P. G., 1994 *A New Method to Calculate the Extinction Properties of Irregularly Shaped Particles*, in Infrared Cirrus and Diffuse Interstellar Clouds, ed. R. M. Cutri and W. B. Latter (ASP Conference Series 58: San Francisco, 1994), pp. 299.

Rouleau, F., & Martin, P. G., 1994 *Proximity Effects in Clusters of Particles*, in Infrared Cirrus and Diffuse Interstellar Clouds, ed. R. M. Cutri and W. B. Latter (ASP Conference Series 58: San Francisco, 1994), pp. 300.

Martin, P. G. *Beals Prize Lecture. Interstellar Pinball: A Sometimes Shocking Story of Excited Molecular Hydrogen*, Journal of the Royal Astronomical Society of Canada, **88**, 246, 1994.

Martin, P. G. *Polarization of the 2175 Å Extinction Feature*, Journal of the Royal Astronomical Society of Canada, **88**, 266, 1994.

Kim, S.-H., & Martin, P. G. *Can We Improve upon "Astronomical Silicate"?*, Journal of the Royal Astronomical Society of Canada, **88**, 263, 1994.

Mandy, M. E., & Martin, P. G., 1995. *Energy Transfer in Molecular Hydrogen: the Role of Open and Closed Shell Collision Partners*, in 23rd International Symposium on Free Radicals.

Ferland, G. J., Rubin, R. H., Martin, P. G., Dufour, R. J., O'Dell, C. R., Wen, Z., Baldwin, J. A., Hester, J. J., & Walter, D. K., 1996 *Effects of Extinction on Broad Band Spectra of H*II *Regions*, Bulletin of the American Astronomical Society, , , .

Rubin, R. H., Ferland, G. J., Dufour, R. J., O'Dell, C. R., Wen, Z., Baldwin, J. A., Hester, J. J., Martin, P. G., & Walter, D. K. *The N/O Abundance Ratio in the Orion Nebula From UV Lines*, Bulletin of the American Astronomical Society, , , 1996.

Baldwin, J. A., ..., Martin, P. G., ... *Physical Conditions in Low Ionization Regions of the Orion Nebula*, Bulletin of the American Astronomical Society, , , 1996.

Clayton, G. C., Wolff, M. J., Kim, S.-H., & Martin, P. G. *Polarization Observations of the 2175 Å Extinction Feature*, Bulletin of the American Astronomical Society, **28**, 914, 1996.

Dougherty, S.A., ..., Martin, P. G., ... *The DRAO Galactic Plane Survey Project*, Bulletin of the American Astronomical Society, **28**, 1220, 1996.

9. Publications in Preparation

Herschel. Several papers describing Galactic star formation in (i) W3, (ii) Orion A, (iii) Perseus, (iv) Cepheus, (v) NGC 7538. Several papers on evolution of dust in atomic and molecular gas (IVC G86 to DC300).

Planck. Several "intermediate" papers describing further Galactic science on dust and H II regions.

GBT. Several papers based on my GBT observations of the two DRAO Planck Deep

Fields and searches for dust in HVCs. Boothroyd et al. on stray radiation correction. Martin et al. on the survey. Blagrave et al. on the DRAO survey.

DRAO. Several papers will be forthcoming based on analysis of DRAO/ST observations of intermediate latitude cirrus in 7 fields.

D. Teaching

12a. Recent Undergraduate Activities

AST 101 and AST 201: I have not actually taught these courses but I invested a lot of effort into planning their migration to Convocation Hall (to meet the ever-expanding demand for these courses). To provide for an enhanced experience in (despite) this large-lecture-hall setting, use of new technology is required. We have a lot of visual images, simulations, and animations to present in the most effective way, in concert with a curriculum that we continue to evolve. An excellent start in presenting these courses was made in 2003-04 and an outstanding teaching award was earned in 2004-05. We have introduced interactivity to fully engage the students and, hope through new control technology, promote immersive access to rich media. In addition we have reintroduced tutorial/lab sessions, despite the enrolment growth to 1300 students in each of 101 and 201. In 2010 we added sessions in our new planetarium.

AST 425H: 4th year astrophysics individual studies for program specialists. In 2005-6 I supervised Kaushi Bandara. She worked first on defining the valid frame ranges for the first maps from BLAST, and then did some analysis of some bright high-mass protostars in one of our Galactic plane fields. In 2006-7 I supervised M. Rahman who investigated massive star formation using optical and infrared data. He is now in the PhD program.

Planetarium: We submitted a CRIF proposal to install a modern interactive planetarium to enhance the student experience in all of our undergraduate courses. This was successful and with additional funding from the Dunlap Institute the planetarium was installed in summer 2010. In 2010–11 we added planetarium sessions for all of our undergraduates, serving more than 2500 students. The planetarium has also become a popular feature of our public outreach.

12b. Recent Graduate Activities

AST 1501Y: This new course is aimed at teaching the equivalent of a lecture course through actual research in that sub-field. In 2006–07 I was the one-on-one supervisor of Marco Viero. He worked on the diffuse interstellar medium, examining dust evolution in intermediate velocity clouds using BLAST and the GBT.

Research School in Alexandria
I presented a series of lectures over two weeks at the Bibliotheca Alexandrina in Egypt in March/April 2006. The goal was *"to expose young scientists to major astronomical themes and to show them how material they learn in the university enables them to participate in cutting edge astronomical research."* We had students from Egypt, Lebanon, Morocco, France, Greece, and India. I was of some assistance to the organizer Amr El Zant in the planning of this event.

Summer Schools
The most recent summer school for graduate students (largely Canadian) was a one week event in Victoria in August 2006. I lectured on star formation research with the Herschel Space Observatory.

Ph. D. General Examination
I participate regularly in the qualifying examination of Ph. D. students in the Department of Astronomy and Astrophysics.

Ph. D. Thesis Committees
I am typically on several of these committees which monitor the progress of students in the Department of Astronomy and Astrophysics.

12c. Research Supervised

Postdoctoral Fellows and Research Associates

A. Boothroyd	Regions of Star Formation	1986-88
A. Chang	Regions of Star Formation	1986-88
T. Hasegawa	Regions of Star Formation	1986-88
A. Noriega-Crespo	Regions of Star Formation	1986-88
P. Barnes	Regions of Star Formation	1988-90
A. Raga	Regions of Star Formation	1988-90
S. Terebey	Regions of Star Formation	1989
W. Keogh	Collisions of H_2 with D, He, and H_2	1992-93
F. Rouleau	Electromagnetic Scattering	1993
A. Boothroyd	Potential Energy Surfaces Involving H_2	1994-95
S.-H. Kim	Interstellar Dust	1995
J. Tsai	Galactic Ecology	1994–96
D. Johnstone	Galactic Ecology	1996–99
S. Basu	Star Formation	1996–99
A. Lazarian	Interstellar Medium	1998–99
P. van Hoof	Nebulae	1998–01
J. Weingartner	Galactic Ecology	1999–03
M.-A. Miville-Deschênes	Interstellar Medium	2002–04
A. Boothroyd	VGPS, GBT surveys	2004–
J. Fischera	Evolution of Dust (Herschel)	2006–9
K. France	Photodissociation Regions (Herschel)	2006–7
K. Blagrave	North Ecliptic Pole Survey (Planck)	2006–
M. Compiegne	Evolution of Dust	2007–10
A. Roy	Herschel star formation	2011–

Ph. D. Students

B. Everson	1979	Mass Transfer in Close Binary Systems	1972-79
J. Maza	1979	Polarization of Seyfert Galaxies and Related Objects	1975-79
C. Rogers	1981	Radiative Transfer in Spherical Geometry with an Anisotropic Phase Function	1977-81
G. Clayton	1983	Interstellar Dust in the Large Magellanic Cloud	1979-83
M. Mandy	1991	Molecular Dynamics of the H + H_2 System	1988-90
F. Rouleau	1992	Shape and Clustering Effects on the Extinction of Light by Amorphous Carbon Grains	1987-92
W. Keogh	1992	Analytical Representations of the H_3 and H_4 Potential Energy Surfaces (with A. Boothroyd)	1989-92
S.-H. Kim	1994	On the Evolution of the Mass Distribution of Interstellar Dust Grains	1991-94
C. Kerton	1999	A Multiwavelength Study of Dust Associated with H II Regions and their Environs	1996–99
E. Verner	1999	[Fe II] in H II Regions	1998–99
J. Karr	2002	Triggered Star Formation	1999–02
K. Blagrave	2006	Orion Nebula from UV to IR	2000–06
P. Ehlers (with Netterfield)	–	Cold Galactic Dust (Boomerang)	2002–
T. Rothwell	–	MHD Simulation of Interstellar Shells	2003–04
E. Pasquale (with Netterfield)	2007	BLAST on HVCs	2005–7
D. Wiebe (with Netterfield)	2008	BLAST on Star Formation	2005–8
D. Goncalves	–	High Latitude Cirrus (Planck)	2006–
A. Roy	2011	Star formation in Cygnus X (BLAST)	2007–11
A. Rivera-Ingraham	–	Early star formation in W3 (Herschel)	2009–

M. Sc. Students

S. Alers	1977	Optics for Polarimetry	1975-77
R. Rusk	1981	The DDO Reticon System	1980-81
A. Rusk	1983	A Study of the Dissociation of Molecular Hydrogen in Interstellar Shocks (informally with J. E. Dove, Chemistry)	1980-83
C. Westbury	1986	An Approximate Method for the Calculation of Effective Recombination Coefficients	1985-86
M. Richer	1989	Neutral Oxygen in Planetary Nebulae: – Probing Radiative Transfer and Nebular Structure	1988-89
S.-H. Kim	1991	Numerical Simulations of Time-dependent Stellar Jets (nominal, with A. Raga)	1989-91
D. Schwarz	1991	The Cooling Function for H_2	1990-91
D. Ballantyne	1999	Protoplanetary Disks (nominal, with D. Johnstone)	1998-99
K. Blagrave	2000	Faint Lines in the Orion Nebula	1999-00
T. Rothwell	2001	Continuum Sources in the VGPS	2000-01

Senior Undergraduates

C. Rogers	Scattering by Spheroids	1975-76
D. Guiguere	H I and IRAS Observations	1993-94
D. Samoylof	Nebular Astrophysics with CLOUDY	1997-98
K. Bandara	BLAST High Mass Protostars	2005-06
M. Rahman	High Mass Star Formation in Perseus	2006-07

NSERC and other Summer Students

A. Dickson	1989	Spectral Line Observations of Orion B (with P. Barnes)
M. Lister	1990	Spectral Line Observations of Orion B (with P. Barnes)
A. Brown	1994	Collisionally Induced Dissociation of H_2 by H_2
G. Young	1995	Collisional Excitation of H_2 by H_2
A. Shen	2004	Hydrodynamical Evolution of the Orion Nebula
A. Hou	2007	BLAST Power Spectra
L. Einstein	2007	Highly Reddened Stars in W3

Co-op Student

D. Ballantyne	1996	Multi-frequency Study of KR 140

Recent Administrative Positions and Professional Duties

University of Toronto

Past year

SGS-appointed Chairman, Ph.D. oral examinations, 1980–
Graduate Admission Committee, Department of Astronomy and Astrophysics, 1989–2010
Chair, Department of Astronomy and Astrophysics, 1999–2010
Academic Standards, General Committee, and Faculty Council of the Faculty of Arts and Science, 1999–2010
Member of the Massey Corporation, 2003–
Faculty Advisor, Astronomy and Space Exploration Society, 2003–2010
Graduate Education Council, 2007–10
Co-chair, University of Toronto Space Program, 2008–
Interim Director, Dunlap Institute for Astronomy and Astrophysics, 2008–2010
Vice-Presidential Committee to revise the Connaught Programs, 2010

Recent past (1989–)

Acting Director, CITA, 1989 and on demand
Vice-Presidential Task Force on Large Scale Computing, 1989
Parallel Computing Facility Vice-Presidential Task Group, 1990
Connaught Physical Sciences Review Panel, 1989-92
Five-year review of CITA, 1995-96
Computing Czar, CITA, 1984–99
Provostial Assessor, 1988–97
Awards Committee, Department of Astronomy and Astrophysics, 1994–99
Academic Advisory Committee of the Computing Management Board, 1995–01
Visitor Czar, CITA, 1996–99
Awards Committee, Math and Physics Class of '30 Scholarship, 1996–99
University Tribunal on Academic Offences, 1998–01
Raising our Sights Planning Committee, Department of Physics, 1999
Associate Director, CITA, 1999
Organizer, Wiegand Lectures, 2000
Organizer, Hogg Distinguished Visitorship, 2001
Presidential committee to review portfolio of Vice-President, Research and International Relations, 2002
Internal adjudication committee for CFI applications, GRIP, 2003
Dean's merit committee, 2003–5
Budget advisory committee, Faculty of Arts and Science, 2004–5
Organizer, Hogg Distinguished Visitorship, 2005
Advisor, Cosmic Frontiers Lecture Series, 2005
Advisory Committee for High Performance Computing and now SciNet, 2004–8

Outside the University

Current

Scientific Organizing Committee, MW2011 The Milky Way In The Herschel Era: Towards A Galaxy-Scale View Of The Star Formation Life-Cycle, 2011
Co-coordinator, Galactic and solar system science, Planck collaboration, 2011–
Member, Commission J (radio astronomy) of URSI (Union Radio-Scientifique Internationale), 2000–
College of Reviewers, Canada Research Chairs, 2000–

Associate Investigator, Planck satellite, ESA, 2000–
Management Committee, International Galactic Plane Survey, 2001–
HIFI Science Team, Herschel Space Observatory, 2002–
NIRCam Science Team, James Webb Space Telescope, 2002–
SPIRE Science Team, Herschel Space Observatory, 2003–
Consultant/advisor, TMT, 30-m Telescope project, 2003–
Hi-GAL Steering Committee, Herschel Space Observatory, 2004–
Management Committee, DRAO Planck Deep Fields, 2005–
MIPSGAL Science Team, Spitzer Space Telescope, 2006–

Recent past (1989–)

Board of Directors of the Canadian Astronomical Society, 1986-89 (Chair, Awards Ctte.)
FCAR Review Committee for the Observatoire du Mont Mégantic, 1989
NASA Review Panel for Long-Term Space Astrophysics, 1990
Scientific Organizing Committee, The First Symposium on the Infrared Cirrus and Diffuse Interstellar Clouds, 1993
Scientific Organizing Committee, Diffuse Interstellar Bands, May 1994
Scientific Organizing Committee, IAU Joint Discussion on Dust in Circumstellar Disks, August 1994
Management Committee, Canadian Galactic Plane Survey, 1994–2001
Scientific Organizing Committee, Polarimetry of the Interstellar Medium, June 1995
Canadian Time Assignment Committee, Canada-France-Hawaii Telescope, 1995
Scientific Organizing Committee, Summer School on the Interstellar Medium (Naramata), 1996
Advisory Board, Herzberg Institute of Astrophysics, National Research Council of Canada, 1993-96
Scientific Organizing Committee, Commission 34 (Interstellar Matter), International Astronomical Union, 1991-97
Scientific Organizing Committee, International Meeting on Galactic Ecology (Naramata), 1998
Chair, CITA High Performance Computing Consortium, 1995–00
Users' Committee, Dominion Radio Astrophysical Observatory, 1995–00 (Chair 1998)
Chair, Joint Committee (of the Canadian Astronomical Society and the Canadian Space Agency) for Space Astronomy, 1999–2002
Scientific Organizing Committee, 21-cm H I Surveys of the Milky Way, US National Radio Astronomy Observatory, 2001
Herschel Space Observatory HIFI Band 6 Board Review, NASA, 2001
Canadian Gemini (Telescope) Science Steering Committee, 2001–05
Founding advisor, Association of Canadian Universities for Research in Astronomy, 2002–03
Advisory Board of the Herzberg Institute of Astrophysics, 2002–05
MIPS Science Team, Guaranteed Time Observations, the Spitzer Space Telescope, 2002–05
Time allocation committee, Hubble Space Telescope, 2003
Vice-President, Canadian Astronomical Society, 2003–06
Consultant/advisor, Mid-Term Review of the Canadian Long Range Plan for Astronomy, 2004
Canadian ALMA Science Steering Committee, 2004–05
NSERC Grant Selection Committee 17 (Space and Astronomy), 2004–07
Panel chair and Time Allocation Committee, Spitzer Space Telescope, 2005
Organizer, International Galactic Plane Survey annual science meeting, UofT, 2005

Chair, Town Hall Meeting, Canadian Space Agency, 2005
Scientific Organizing Committee, Sky polarisation at far-infrared to radio wavelengths: the Galactic screen in front of the Cosmic Microwave Background, IAS, Paris, 2005
Co-chair, Coalition for Canadian Astronomy, 2005–08
Scientific Organizing Committee, Canadian Space Astronomy Workshop, Montreal, 2006
President, Canadian Astronomical Society, 2006–08
Chair, Canadian National Committee of the International Astronomical Union, 2006–08
Ad-hoc Advisory Committee, proposed Research Centre at Bibliotheca Alexandrina, 2006–07
Scientific Organizing Committee, The evolving interstellar medium, Pasadena, 2007
MUSTANG Science Team, GBT, 2007–09
Visiting Committee, Computation and Information Technology, Institute for Advance Study, Princeton, 2009
Scientific Organizing Committee, Annual Symposium (dedicated this time to Astronomy), Royal Society of Canada, 2009
Past-President, Canadian Astronomical Society, 2008–2010
University of Toronto representative, Association of Universities for Research in Astronomy. 2008–10

E. Other

a. Outreach

Over the years I have made various contributions (notice how technology changes) relating to this important aspect of my position, including: consulting for Moreland-Latchford on filmstrip series for elementary schools; audio-visual (slide/tape) shows for the Science Open Houses at Scarborough College; speaking to the Toronto Centre of the RASC; lecturing in the "Astronomy Now" series at University of Cambridge; appearing on television in Toronto through OECA; being interviewed on BBC radio; designing display cases in the McLennan Physical Laboratories and at Scarborough College; lecturing to the Royal Canadian Institute; lecturing in the Ontario government sponsored "In Search of Learning" series; arranging a major public lecture on SETI; preparing material from the Canadian Galactic Plane Survey for the Ontario Science Centre; lecturing to the Senior Alumni; arranging the Wiegand Lecture Series for the Faculty of Arts and Science; lecturing to gifted students of the TCDSB; lecturing to local and regional amateur astronomy associations; tours of the DDO; and judging at the Toronto-Wide Science Fairs. I have had discussions with a publisher on a popular book which I am developing (but never completing!). I have led an Elderhostel week on Cosmology. My pictures of a planet "alignment" are on http://www.cita.utoronto.ca/[tilde goes here]pgmartin/alignment. I had a booth at the Mining in Society show at the MTCC, showing hundreds of visitor the oldest rocks in the solar system and explaining the origin of the elements. I led a Science Round Table and spoke at a Senior Fellows' Lunch at Massey College. I participated in a video for Herschel Space Observatory. I hosted a Breakfast with the Bulletin event and spoke to the King's College Circle Heritage Society.
In the past many years I have worked with the AstroGrad Network (alumni of our undergrad program) and been a faculty mentor for the student Astronomy and Space Exploration Society. I supported enhancements to our visitor programs at our St. George Observatories, and for Earth Day, Astronomy Day, Science Rendezvous, and Nuit Blanche. Through the Dunlap Institute I have supported the CoolCosmos campaign on the TTC (and web) and other events during the Internaitonal Year of Astronomy, and established a unique Science Journalist in Residence program (held by Ivan Semeniuk). I wrote, developed, and presented a visual program for the day-long kickoff of the International Year of Astronomy at the Ontario Science Centre. I championed the importance of our new planetarium. I am still exploring initiatives with Outward Bound and the TDSB re programming at the Brickworks, aimed at disadvantaged youth, and am an informal consultant to two film makers.

b. Expert Refereeing

A considerable effort is spent as a referee for the journals *Astrophysical Journal, Monthly Notices of the Royal Astronomical Society, Astronomical Journal, Astronomy and Astrophysics* and *Nature*. In addition to a critique I often write extensive constructive comments which I feel would enhance the impact of the papers. Generally I waive my anonymity. While a lot of this work goes unrewarded in any concrete sense, there is an appreciation for good refereeing, and I have received many letters of appreciation.

Research grant applications to NSERC, the Killam Foundation, Canada Research Chairs, Canadian Foundation for Innovation, the NSF (USA), NASA, PPARC (UK), and the Netherlands Foundation for Astronomy, and observing time requests to the Canada-France-Hawaii Telescope, Gemini, and the James Clerk Maxwell Telescope are reviewed regularly. I served on a Selection Panel for HST and the TAC for Spitzer Space Telescope and the NSERC GSC 17 for Space and Astronomy..

F. EXTRACURRICULAR: Life beyond the office

Music. I make time to play my violin. I play primarily in the Hart House Symphony Orchestra (fours concerts here at UofT this year). Auditioning for this competitive orchestra is among the more challenging things I face every year! I am also a founding member of the cantata ensemble MACABRE at Massey College.

Water and ice. I eagerly await warmer weather every year to swing on the trapeze of my sailboat (I now have a dry suit to extend the season!), and in more leisurely moments paddle in canoe and kayak if not on my motorbike. In the off season I ski and skate.

Home front. I am an active parent of three students still at home and UofT this year (a fourth has left the nest to teach in London, Tokyo and now Toronto). I have the pleasure of helping my spouse Camie mount many shows of her bronze sculpture, doing practical work with my hands in her studio, and being her webmaster (camie.ca).