

# Dr. William A. van Wijngaarden

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## EXECUTIVE SUMMARY

William van Wijngaarden has an impressive record of academic administrative leadership. This was particularly evident when he chaired the Faculty of Science and Engineering Council (2005-06) and York's Senate (2010-13), and diplomatically diffused a number of contentious issues. He has been elected to several leadership positions in the International Union of Pure and Applied Physics (2002-08) and also held responsible positions in the American Physical Society and the Canadian Association of Physicists.

In 1999, Dr. van Wijngaarden led a successful application for a Network of Centres of Excellence serving as Program Leader of the Canadian Institute for Photonic Innovations (1999-01). CIPI comprised 65 researchers, 25 universities as well as over 40 company and research center participants. The researchers represented a variety of disciplines including biomedicine, chemistry, computer science, engineering and physics. Dr. van Wijngaarden managed a budget of over \$22 million. In 2001, he chaired the Steering Committee on General Physics, which successfully recommended new initiatives for funding to the NSERC Reallocations Committee. He served multiple terms on the Appraisal Panel for the Ontario Council of Universities (2002-07) that approved over 300 graduate programs and served on the NSERC Physics Grant Selection (2007-09) and Research Tools & Instrument Committees (2015).

Dr. van Wijngaarden began research at the University of Windsor studying the electron impact



excitation of  $\text{SO}_2$ . He graduated in 1982 with a BSc in Computer Science and a separate Honours BSc in Physics. He went to Princeton University and obtained a MSc in 1984 followed by a PhD in Physics in 1986.

After a year at Yale University, Dr. van Wijngaarden joined the faculty at York University in 1988. In 2003, his group laser cooled Rb atoms to create Canada's first Bose Einstein Condensate. More recently, he measured the relative nuclear charge radius of  ${}^{6,7}\text{Li}$  with an uncertainty of  $1 \times 10^{-18}$  meter. He has also studied applied/interdisciplinary topics such as laser isotope separation, electromagnetically induced transparency for use in optical switching, environmental monitoring of pollutants and climate change. He has more than 80 refereed publications and given over 200 conference presentations invited seminars.

Dr. van Wijngaarden has taught over a dozen different courses ( $> 100$  semester courses plus numerous tutorials) to thousands of undergraduate and graduate students. He is known for well organized lucid lectures. His pedagogical innovations have borne results. Typically, 90% of the students pass his challenging introductory physics course taught to nonphysics majors.

Dr. van Wijngaarden received the University of Windsor Board of Governor's Medal in 1982, the 1967 NSERC graduate scholarship, Princeton University's Joseph Henry Scholarship and a number of large research grants. He and wife Theresa are the proud parents of Arie, Alice, Emma, Ellen and Marinus. He is conversant in Dutch and reads French and German.

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## EDUCATION

### **June 1986      Ph.D., Physics, Princeton University**

W. A. van Wijngaarden developed a new method to measure oscillator strengths or absolute transition probabilities which was important for optimizing laser isotope separation. The thesis was entitled “The Inverse Hook Method for Measuring Oscillator Strengths”. The significance was that this innovative method was applicable to the study of transitions between excited states unlike existing techniques. This enabled the selection of transitions that maximized the efficiency of stepwise laser excitation to selectively ionize a particular isotope.

### **June 1984      M.Sc., Physics, Princeton University**

A Preliminary Examination tested knowledge of Classical Mechanics, Electricity and Magnetism, Statistical Physics and Quantum Mechanics. The subsequent General Examination tested knowledge of General Relativity, Solid State Physics, High Energy Physics, Nuclear Physics and Atomic Physics. In addition, students were questioned by two separate committees. The final requirement was completion of an experimental project which was entitled “Relaxation of Spin Polarized Xe<sup>131</sup> Nuclei”. This showed how the angular momentum of optically pumped Rb atoms could be transferred to align the Xenon nuclear spins which is today used for NMR imaging.

### **October, 1982      B.Sc., Computer Science, University of Windsor**

This degree gave extensive experience developing software programs using a variety of computer languages including Assembler, Fortran, Basic and PL/One.

### **June 1982      Honours B.Sc., Physics, University of Windsor**

W. A. van Wijngaarden was the top student of his graduating class and received the University of Windsor Board of Governor’s Medal. He also did an Experimental Project as a Senior Thesis entitled “Dissociative Excitation of SO<sub>2</sub> by Controlled Electron Impact”.

### **June 1978      Forster Collegiate**

W. A. van Wijngaarden was the top student of his graduating class and received the highest University of Windsor Entrance Scholarship. He graduated with 45 credits of which 11 were Grade 13 subjects, nearly twice the number required.

## **PROFESSIONAL AND ACADEMIC EXPERIENCE**

### **2000–present Full Professor, Dept. of Physics & Astronomy, York University**

Notable administrative responsibilities included chairing the Senate of York University, serving multiple terms on the Graduate Adjudication Committee of the Council of Ontario Universities, chairing the Faculty of Science and Engineering Council, holding various positions with the International Union of Pure and Applied Physics and leading the successful application to create the Canadian Institute of Photonic Innovations, a Network of Centres of Excellence. Significant research milestones included creating Canada's first Bose Einstein Condensate, demonstrating an array of microtraps for ultracold atoms, precisely measuring lithium isotope shifts to determine the relative nuclear charge radius to an accuracy of a few parts times  $10^{-18}$  meter as well as examination of climate change in North America during the last 60 years. Teaching innovations in first year Physics led to better understanding of the subject material and improved student retention.

### **2003-2004 Visiting Scientist, Environment Canada**

Over a hundred million archival observations of temperature, humidity and precipitation were carefully examined to study human caused climate change. The data were first analyzed for inhomogeneities caused by changes in instruments and/or observation procedure. Trends were found for time series not having abrupt discontinuities. Statistically significant warming trends were most evident in the Canadian Prairies and the western Arctic in winter and to a lesser extent in spring corresponding to a decrease in relative humidity and precipitation.

### **1992-1999 Associate Professor, Dept. of Physics & Astronomy, York University**

A major responsibility was serving in various capacities in the American Physical Society and the Canadian Association of Physicists. Dr. van Wijngaarden's laboratory developed a novel technique to measure frequency intervals using a laser beam modulated using either an acousto or electro-optic modulator. This allowed the determination of hyperfine intervals, stark shifts and polarizabilities to unprecedented accuracies. The research also demonstrated electromagnetic induced transparency for use in optical switching.

### **1988-1992 Assistant Professor, Dept. of Physics & Astronomy, York University**

A reputation for very clear and lucid lectures was developed in teaching Mathematics and Physics courses to undergraduate and graduate students. Dr. van Wijngaarden's course notes were subsequently used by several colleagues. A research laboratory was established and the hyperfine interaction was studied using Quantum Beat and Level Crossing spectroscopy.

### **1987-1988 Research Associate, Dept. of Physics, Yale University**

Dr. van Wijngaarden worked on an experiment to precisely measure the Rydberg constant and frequency intervals in Helium.

### **1987 Instructor, Dept. of Physics, Princeton University**

Responsibilities included supervising teaching assistants in a first year physics course. A seminal paper on optical pumping was also published.

### **1986 Research Associate, Dept. of Physics, Princeton University**

Publications resulting from the PhD work were submitted and a graduate student was supervised on a Quantum Beat Spectroscopy experiment.

## AWARDS AND DISTINCTIONS

### PERSONAL

- McLaughlin College Outstanding Fellow Award (2016)
- Calumet College Award for Most Active Fellow (2013)
- Professional Physicist Certification by Canadian Association of Physics (2002), renewed 2010
- York Merit Award, 2009, 2008, 2007 and 2004
- Research Development Award from York University (2005-2006)
- 1967 Scholarship (1982-1986). NSERC awarded a handful of these graduate scholarships every year. Each Canadian university nominated typically 2 candidates for an interview by the selection committee.
- Joseph Henry Entrance Graduate Scholarship from Princeton University (1982)
- University of Windsor Board of Governor's Medal in 1982
- Top University of Windsor Undergraduate Scholarship (1978-1982)

### TO STUDENTS/POSTDOCTORAL FELLOWS UNDER MY SUPERVISION

- Nomination for York University PhD Thesis Prize (2014) and recommended for nomination to the Canadian Association of Graduate Studies by York's Faculty of Graduate Studies to B. Jian (2015)
- R. W. Nicholls prize for best talk at Physics Graduate Students Conference to B. Jian (2013)
- Provost Dissertation Scholarship to B. Jian (2013-2014)
- Research at York Award to T. Cazes (2012-2013)
- Research at York Award to I. DeSouza (2011-2012)
- Research at York Award to N. Bezginov (2010-2011)
- Best Atomic/Optical Physics Poster at Canadian Association of Physics Congress to E. Chemali (2010)
- R. W. Nicholls prize for best talk at Physics Graduate Students Conference to E. Chemali (2010)
- Nomination for York University Ph.D. Thesis Prize to B. Schultz (2010)
- Research at York Award to A. Vijaratnam (2009-2010)
- Research at York Award to V. Isaac (2009-2010)
- Susan Mann Dissertation Scholarship to B. Schultz (2009-2010)
- Ontario Graduate Scholarship to B. Schultz (2008-2010)
- Nomination for York University M.Sc. Thesis Prize to G. Humphrey (2009)

## **TO SUPERVISED STUDENTS/POSTDOCTORAL FELLOWS, CONT'D**

- Best Student Talk in Session entitled Laser Cooling and Atom Trapping at Canadian Undergraduate Physics Conference to E. Chemali (2008)
- Ontario Graduate Science and Technology Award to G. Noble (2008)
- Yong-Ki Kim Award for best poster at Division of Atomic Molecular and Optical Physics Meeting of the American Physical Society which had over 800 participants to G. Noble (2007)
- NSERC Graduate Scholarship to B. Schultz (2006-2008)
- Nomination for York University Ph.D. Thesis Prize to J. J. Clarke (2002)
- JDS Uniphase Graduate Scholarship to J. J. Clarke (2002)
- Nomination for York University M.Sc. Thesis Prize to J. Walls (2001)
- Ontario Graduate Science and Technology Award to J. Walls (2000)
- NSERC Graduate Scholarship to J. J. Clarke (1997-2001)
- NSERC Undergraduate Award for summer research to M. van Leeuwen (1989)

## NOTABLE ADMINISTRATIVE CONTRIBUTIONS

### YORK UNIVERSITY SENATE VICE CHAIR/CHAIR (2010-2013)

Dr. van Wijngaarden chaired Senate meetings efficiently in a collegial manner and at times with humour. His leadership was noted for respectful listening to diverse views and patient consensus building to resolve a multitude of issues. His advice was sought on many informal occasions by the President and Provost, as well as formally when he led or was an active participant in the deliberations of the following committees.

1. **SENATE EXECUTIVE (CHAIR):** This committee which includes the President, Provost and members from each of York's nine Faculties, met monthly to approve Senate agendas and receive reports from its SubCommittees and other Senate Committees.
  - a) **EQUITY SUBCOMMITTEE (CHAIR):** This committee, consisting of faculty as well as undergraduate and graduate students, investigated concerns arising from the Canadian Federation of Students Ontario Task Force on Campus Racism Report and a Graduate Student Association (GSA) Equity Audit that purported to show a disproportionate number of students of certain ethnic/racial backgrounds have been charged with academic dishonesty. It examined relevant documentation, interviewed over a dozen individuals in positions dealing with graduate students, and international students in particular, and received a presentation from GSA officials. Dr. van Wijngaarden authored the unanimous committee report that found no evidence to substantiate anecdotal concerns raised in the two reports. However, a number of the supports available to graduate students and faculty were found to be suboptimal and recommendations were made to improve Student Orientation and expand Writing Support services particularly geared to international students.
  - b) **WORKING GROUP ON EXTERNAL PARTNERSHIPS (CHAIR):** In the spring of 2012, York University underwent considerable acrimonious tumult about a proposed partnership with the Centre for International Governance Innovation (CIGI) funded by J. Balsillie, culminating in a petition signed by over 300 faculty members expressing strong concern about the potential adverse impact on academic freedom and the university's autonomy. Dr. van Wijngaarden led a Working Group that consisted of a diverse array of 8 highly respected and experienced faculty members plus a graduate student. It discussed voluminous documentation from internal sources and other universities, a growing scholarly literature and media accounts as well as interviewed Organized Research Unit Directors, the President of the York University Faculty Association, all Faculty Deans and the Vice Presidents of Fund Raising & Development and Research & Innovation. Dr. van Wijngaarden together with the committee secretary R. Everett, authored the 29 page report that was unanimously endorsed by the Working Group. It recommended Senate endorse a list of 8 principles for External Partnerships that clearly and transparently spell out the responsibilities of the University and External Partners. The report was greeted with enthusiasm in an atmosphere very markedly more collegial than that existing on campus 12 months earlier.
2. **BOARD OF GOVERNORS:** In addition to attending these meetings held every 3 months, Dr. van Wijngaarden developed an excellent rapport with Board Chairs, Paul Cantor and Julia Foster as well as with other Board of Governors. He and the Board Chair led the annual meeting of the Executives of the Senate and Board of Governors. An issue of particular importance was the special joint meeting called to discuss the reappointment of the President.
3. **ACADEMIC POLICY, PLANNING AND RESEARCH:** This committee met on average every 2 weeks and worked with the Provost to formulate a University Academic Plan and subsequently hear annual reports given by each Dean. In conjunction with the Vice President of Research & Innovation, it also formulated a Strategic Research Plan, created a program for York Research Chairs to stimulate world

class research and revised procedures for creating/renewing Organized Research Units. A number of other issues were considered such as the university response to the Council of Ontario Universities initiative on Online Learning, University Promotion to high school students in Ontario as well as potential international students, Student Satisfaction, Tenure and Promotion Policies etc.

4. **ACADEMIC STANDARDS, CURRICULUM AND PEDAGOGY:** Each year, scores of new programs and curricular changes, recommended by this committee, are forwarded to Senate for approval. Some of these proposals were contentious and Dr. van Wijngaarden successively mediated several disputes.
5. **HONOURARY DEGREES AND CEREMONIALS:** This committee met several times each year to consider candidates who have made significant contributions to their community, York University, Canada and/or the world. Approved candidate names remain confidential and are entered into a pool, from which the ultimate selection is made by Chancellor Roy McMurtry and President Mamdouh Shoukri. Dr. van Wijngaarden was particularly satisfied to award an Honourary Doctorate at convocation to a distinguished individual he nominated.
6. **PRESIDENT'S ADVISORY COUNCIL ON HUMAN RIGHTS:** This high level group of university administrators met every 3 months to listen to faculty and student concerns about diversity issues and advise the President regarding concerns such as upholding Academic Freedom when contentious issues arise on campus, and how University policies may need to be adjusted to accommodate the recently passed Accessibility for Ontarians with Disabilities Act (AODA).
7. **STUDENT ROUNDTABLE:** This monthly meeting chaired by the Vice President of Students comprised student leaders from the various Colleges as well as representatives from the undergraduate York Federation of Students and the Graduate Students Association.
8. **RECRUITMENT COUNCIL:** This monthly meeting discussed York University's ongoing promotion and recruitment efforts such as: the Ontario University Fair held at the Toronto Convention Center, university open house as well as entrance scholarships.
9. **MISCELLANEOUS:** This included a number of addresses to student groups and Faculty Councils and leading Spring and Fall convocations, sometimes in French. Dr. van Wijngaarden was also responsible for deciding whether to close the university due to inclement weather.

## **FACULTY OF SCIENCE & ENGINEERING COUNCIL CHAIR (2004-2006)**

The Faculty of Science and Engineering (FSE) faced a number of unusually contentious issues during the Dr. van Wijngaarden's tenure as Council Chair.

1. **ENGINEERING:** The three engineering programs in Geomatics, Space Science and Computer Engineering failed to be accredited. The Accreditation panel pointed out a number of deficiencies. At the request of FSE Dean Gill Wu, Dr. van Wijngaarden put together a proposal to create a School of Engineering to be housed in FSE. This proposal was initially greeted with considerable reservations. Dr. van Wijngaarden had extensive discussions with the chairs of the FSE departments and others. The result was the unanimous approval by FSE Council. Dr. van Wijngaarden subsequently presented the proposal to the Senate Executive Committee and it was approved by York's Senate. The three engineering programs subsequently gained accreditation status.
2. **TRANSFER OF SCIENCE AND TECHNOLOGIES STUDIES PROGRAM into FSE:** Moving this program from the Faculty of Arts into FSE had been tried several years earlier and failed after considerable controversy. Dr. van Wijngaarden patiently listened to people's concerns before bringing it to FSE Council, where it was passed unanimously.



3. **TRANSFER OF MATHEMATICS DEPARTMENT into FSE:** There was initial concern about whether FSE would approve the transfer of Mathematics from the Faculty of Arts. Dr. van Wijngaarden suggested that the motion “welcoming the Mathematics Department into FSE” which Council passed unanimously.
4. **EXECUTIVE AND PLANNING COMMITTEE:** This committee which included the Dean and members from each Department, met monthly to approve FSE Council agendas. It received reports from various committees regarding curriculum, petitions, admissions, appeals, nominations etc. which were forwarded to Council.
5. **DECANAL SEARCH:** President Lorna Marsden contacted Dr. van Wijngaarden seeking advice about the composition of the Decanal Search Committee following her decision not to reappoint the Dean of FSE.

### **CANADIAN INSTITUTE FOR PHOTONIC INNOVATIONS (1999-2001)**

Dr. van Wijngaarden led the effort to establish the Canadian Institute for Photonic Innovations (CIPI), a Network of Centres of Excellence beginning in 1997. The competition consisted of two rounds. Initially, there were 72 applications of which 11 were shortlisted. Each of these was then given some seed money to prepare a detailed full proposal. Dr. van Wijngaarden led the CIPI delegation that underwent rigorous all day questioning by an Expert Panel consisting of leading photonics researchers from around the globe. Their report was submitted to NSERC which selected 3 Networks to fund in 1998. The head of NSERC, Dr. T. Brzustowski notified Dr. van Wijngaarden that CIPI was the very close runner-up and suggested he contact the government for additional funding. Dr. van Wijngaarden organized a successful lobby that briefed members of the inner Cabinet. CIPI was announced in 1999 and comprised 65 researchers, 25 universities as well as over 40 company and research center participants. The researchers represented a variety of disciplines including biomedicine, chemistry, computer science, engineering and physics. Dr. van Wijngaarden’s responsibilities included the following.

1. **APPLICATION LEADER:**
  - a) **UNIVERSITY RECRUITMENT:** Dr. van Wijngaarden travelled to nearly every university in Canada to recruit participants. A laboratory visit allowed a much better assessment of an individual’s research activity than reading a report or listening to a video teleconference call.
  - b) **INDUSTRIAL AFFILIATE RECRUITMENT:** Dr. van Wijngaarden visited private sector companies, hospitals and government research organizations to better understand how CIPI could help meet their research needs. The overwhelming feedback was to train more highly qualified personnel. Some researchers were concerned that their students would be seduced by high salaries in the private sector before completing their degrees. This occurred to H. Chen, a talented postdoc of Dr. van Wijngaarden, who was recruited along with his wife to work for EXFO, a Quebec City telecommunications company.
  - c) **WORKSHOP ORGANIZATION:** A workshop bringing together industrial and university participants, was held in Toronto to formulate project proposals.
  - d) **PROPOSAL ASSEMBLY:** The first volume described each of the 5 Theme areas: Nanotechnology for Photonics, Engineering of Photonic Devices, Photonics for Information Technology, Ultrafast Photonic Technology and Precision Photonic Measurements along with the specific 17 projects of these themes as well as the Network Administrative Structure, plans for Technology Exploitation, Training of Highly Qualified Personnel etc. The remaining volume contained CVs of the researchers.

## 2. **PROGRAM LEADER:**

- a) **CREATION of BOARD of DIRECTORS:** Dr. van Wijngaarden visited potential directors and organized their first meeting. Other committees were also established and membership was proposed with due regard for principles such as affirmative action.
  - b) **NETWORK AGREEMENT:** Dr. van Wijngaarden wrote this legal document which governed all aspects of CIPI in close consultation with lawyers. This document had to be approved by 1) the university investigators, 2) CIPI's Board of Directors, 3) a majority of the participating universities and finally 4) NSERC. Dr. van Wijngaarden adroitly handled the challenge of dealing with the so called "G-8" grouping of universities who believed their research credentials entitled them to special treatment.
  - c) **HIRING OF ADMINISTRATIVE STAFF:** This included hiring and overseeing the work of various personnel and a Network Manager. Dr. van Wijngaarden closely supervised the development of the website and promotional literature, progress reports, organization of annual meetings etc.
  - d) **PHOTONICS SPEAKING TOUR:** Dr. van Wijngaarden gave a talk entitled "Research and Career Opportunities in Photonics" to 16 universities. A CD of the talk sufficiently impressed the Hon. P. Manning, Leader of the Opposition, that he came to visit Dr. van Wijngaarden's lab at York University.
3. **FINANCIAL ACCOUNTABILITY:** CIPI's budget was over \$22 million. Dr. van Wijngaarden was responsible for regular financial reports to NSERC and the Board of Directors to ensure proper allocation and expenditures of funds.
  4. **RESEARCH MANAGEMENT COMMITTEE (CHAIR):** The research program was divided into 5 themes, each of which was directed by at Theme Leader who reported to Dr. van Wijngaarden. The Theme Leaders plus representatives of network investigators and research affiliates comprised the Research Management Committee. It solicited regular reports from each theme and project to monitor research progress. It also received research proposals and decided which to recommend to the Board of Directors for funding. Dr. van Wijngaarden oversaw special efforts to promote meritorious women and young researchers.
  5. **INTELLECTUAL PROPERTY:** Dr. van Wijngaarden was involved in the transfer of technology that resulted in part by CIPI funding, to a startup company. He also gave a seminar about the responsibilities of network investigators regarding intellectual property. In addition, Dr. van Wijngaarden researched technology transfer of the various Networks of Centres of Excellence. His report, submitted to the Board of Directors, impressed Jean-Claude Gavrel, Director of the Networks of Centers of Excellence Program, who commented that this survey was something his organization should have undertaken.

## **ONTARIO PHOTONICS TECHNOLOGY INDUSTRY CLUSTER (OPTIC) (1999-2001)**

Dr. van Wijngaarden was a founding Board member of OPTIC which is a community of high technology companies and organizations working to support the photonics industry in southern Ontario through:

1. Aiding the global marketing of photonics products
2. Enhancing communication
3. Facilitating strategic alliances and investments
4. Improving education in Optics and Photonics
5. Representing the interest of industry with economic development agencies

## ADMINISTRATIVE FACULTY RESPONSIBILITIES

Year	Responsibility
<b>1988-1989</b>	Petitions Committee Participant in Open House Participant in Science Olympics
<b>1989-1990</b>	Chair of Petitions Committee Participant in Open House Participant in Science Olympics University Scholarships & Grants Committee
<b>1990-1991</b>	Chair of Petitions Committee Participant in Science Olympics University Scholarships & Grants Committee Committee to Evaluate S. Filseth's Request for YAG Laser Funds
<b>1991-1992</b>	Chair of Committee on Examination & Academic Standards
<b>1992-1993</b>	Committee on Examinations & Academic Standards
<b>1993-1994</b>	Committee on Examinations & Academic Standards Technical Services Committee
<b>1994-1995</b>	Sabbatical
<b>1995-1996</b>	Nominations Committee Library Committee Participant in Science Olympics
<b>1996-1997</b>	Nominations Committee Library Committee Tenure & Promotions Committee Senate Committee on Curriculum & Academic Standards Chair of Subcommittee on Grading Evaluated Industrial Chair Applicant (A. Dudelzak) at Request of Dean Prince
<b>1997-1998</b>	Nominations Committee Library Committee Research Committee Senate Committee on Curriculum & Academic Standards (Vice-Chair), Chair of Subcommittee on Grading
<b>1998-1999</b>	Senate Committee on Curriculum & Academic Standards, Chair of Subcommittee on Grading Research Committee Invited to share Pedagogical Techniques with University Teaching Assistants (UTAL 5000)
<b>1999-2000</b>	Research Committee

<b>2003-2004</b>	Faculty of Graduate Studies Council ½ year sabbatical
<b>2004-2005</b>	Faculty of Graduate Studies Council Faculty of Science and Engineering Council Vice Chair Executive & Planning Committee Curriculum Committee Senate, York University
<b>2005-2006</b>	Faculty of Science and Engineering Council Chair Executive & Planning Committee Curriculum Committee Faculty of Graduate Studies Council Senate, York University
<b>2006-2007</b>	Nominations Committee Senate, York University Senate Executive Committee
<b>2007-2008</b>	Nominations Committee Tenure & Promotion Committee Mathematics Preparedness Committee Fellow Calumet College
<b>2008-2009</b>	Fellow Calumet College ½ year sabbatical
<b>2009-2010</b>	Senate Tenure & Promotions Committee Senate, York University Fellow Calumet College Member of FSE Technical Shops Working Group Participant Mar. 4, 2010, in Special Academic Planning Forum to Discuss Proposed White Paper: Strategic Directions for York 2010-2020
<b>2010-2011</b>	Fellow Calumet College
<b>2011-2012</b>	Fellow Calumet College
<b>2012-2013</b>	Fellow Calumet College
<b>2013-2014</b>	Fellow Calumet College Fellow McLaughlin College Committee on Examinations & Academic Standards Curriculum Committee Mechanical Engineering Faculty Search Committee (Faculty of Engineering) (hired N. Tabatabaei & E. Dressaire)
<b>2014-2015</b>	Fellow Calumet College Fellow McLaughlin College

<b>2015-2016</b>	Fellow Calumet College Member of Calumet College Awards Committee Fellow McLaughlin College
<b>2016-2017</b>	Fellow Calumet College Fellow McLaughlin College Senate Awards Committee Faculty of Graduate Studies Vanier Trudeau Preliminary Adjudication Committee Faculty Teaching & Learning Committee (Chair) Faculty Research Awards Committee (Chair)
<b>2017-2018</b>	Fellow Calumet College Fellow McLaughlin College Senate Awards Committee Faculty Teaching & Learning Committee Faculty Research Awards Committee (Chair) Member of Earth and Space Science Tenure & Promotion Committee
<b>2018-2019</b>	Fellow Calumet College Fellow McLaughlin College Senate Awards Committee Alan Carswell Scholarship Adjudication Committee Faculty Teaching & Learning Committee Faculty Research Awards Committee Faculty Appeals Committee
<b>2019-2020</b>	Fellow Calumet College Fellow McLaughlin College Faculty Appeals Committee
<b>2020-2021</b>	Fellow Calumet College Fellow McLaughlin College Faculty Committee on Examinations and Academic Standards Faculty of Science Strategic Planning Committee
<b>2021-2022</b>	Fellow Calumet College Fellow McLaughlin College Faculty Committee on Examinations and Academic Standards Tenure & Promotions Committee for Cross Appointee with Faculty of Engineering Schulich Leader Scholarship Selection Panel
<b>2022-2023</b>	Fellow Calumet College Fellow McLaughlin College Faculty Appeals Committee Academic Colleague to the Council of Ontario Universities Senate Academic Policy, Planning and Research Committee Member of Senate
<b>2023-2024</b>	Fellow Calumet College Fellow McLaughlin College Academic Colleague to the Council of Ontario Universities Senate Academic Policy, Planning and Research Committee Member of Senate

## ADMINISTRATIVE DEPARTMENTAL RESPONSIBILITIES

<b>Year</b>	<b>Responsibility</b>
<b>1988-1989</b>	Examinations Committee Director of Atomic/Laser Physics Seminar Speaker Undergraduate Advisor
<b>1989-1990</b>	Seminar Chair Graduate Admissions Committee Undergraduate Advisor
<b>1990-1991</b>	Curriculum Committee Appointments Committee (hired E. Hessels) Undergraduate Advisor
<b>1991-1992</b>	Appointments Committee (hired N. Bartel) Undergraduate Advisor
<b>1992-1993</b>	Chair of Appointments Committee (nominated 2 unsuccessful URF candidates) Executive and Planning Committee Undergraduate Advisor
<b>1993-1994</b>	Chair of Appointment Committee (hired S. Bhadra) Executive & Planning Committee Undergraduate Advisor
<b>1994-1995</b>	Sabbatical
<b>1995-1996</b>	Appointments Committee Constructed Mass Spectrometer Experiment for PHYS 4210.03 Physics & Astronomy Seneca Task Force Task Force on Core Requirements of Graduate Programme Represented Physics & Astronomy Chair (A. Stauffer) at Canadian Association of Physicists Congress
<b>1996-1997</b>	Seminar Chair Participant in Telephone Recruitment of Undergraduate Students Physics & Astronomy Seneca Task Force Evaluated Industrial Chair Applicant (G. Timothy) at Request of Appointments Committee Chair R. Koniuk Represented Physics & Astronomy Chair (A. Stauffer) at Canadian Association of Physicists Congress

<b>1997-1998</b>	Participant in Telephone Recruitment of Undergraduate Students Graduate Admissions Committee Chair of Awards Committee (Nominated R. Koniuk & J. Darewych who received Teaching Awards)
<b>1998-1999</b>	Appointments Committee (hired A. Kumarakrishnan)
<b>1999-2000</b>	Appointments Committee
<b>2000-2001</b>	Curriculum Committee Participant in Telephone Recruitment of Undergraduate Students
<b>2001-2002</b>	Tenure & Promotions Committee Participant in Telephone Recruitment of Undergraduate Students
<b>2002-2003</b>	Tenure & Promotions Committee
<b>2003-2004</b>	Participant in Telephone Recruitment of Undergraduate Students ½ year Sabbatical
<b>2004-2005</b>	Appointments Committee
<b>2005-2006</b>	Tenure & Promotions Committee
<b>2006-2007</b>	Tenure & Promotions Committee
<b>2007-2008</b>	Awards Committee -nominated A. Sarkisoff for D. Hobson Award
<b>2008-2009</b>	½ year Sabbatical
<b>2009-2010</b>	Awards Committee Chair of Retreat Working Group examining High School Math Preparation of Undergraduates Participant in March 20, 2010 University Open House
<b>2010-2011</b>	Departmental CAP Exam Coordinator for Undergraduate and Professional Physicist Accreditation Exams
<b>2011-2012</b>	Member Graduate Executive Committee
<b>2012-2013</b>	Department Representative for Internships Participant in Telephone Recruitment of Undergraduate Students

<b>2013-2014</b>	<p>Department Representative for Internships  Participant in Telephone Recruitment of Undergraduate Students  Met with Delegation from China National University of Defense Technology (NUDI) at Request of Physics Chair  One of Authors of Dept. Report to York Program Review</p>
<b>2014-2015</b>	<p>Departmental Representative at November University Open House  Participant in Telephone Recruitment of Undergraduate Students  Gave Lab Tour to Several Prospective Students &amp; Families</p>
<b>2015-2016</b>	<p>Sabbatical  Participant in Telephone Recruitment of Undergraduate Students</p>
<b>2016-2017</b>	<p>Participant in Telephone Recruitment of Undergraduate Students</p>
<b>2017-2018</b>	<p>Participant in Telephone Recruitment of Undergraduate Students</p>
<b>2018-2019</b>	<p>Participant in Telephone Recruitment of Undergraduate Students  Undergraduate Advising</p>
<b>2019-2020</b>	<p>Participant in Telephone Recruitment of Undergraduate Students  Undergraduate Advising  Organize High School Teachers Evening Dec. 4, 2019 at Physics &amp; Astronomy Department</p>
<b>2020-2021</b>	<p>Participant in Telephone Recruitment of Undergraduate Students  Undergraduate Advising  Curriculum Committee</p>
<b>2021-2022</b>	<p>Undergraduate Advising  Curriculum Committee  Contract Renewal Committee</p>



## CONTRIBUTIONS TO THE PROFESSION

### INTERNATIONAL UNION OF PURE AND APPLIED PHYSICS (IUPAP)

IUPAP is the world's governing body of physicists and promotes the development of physics around the world. Dr. van Wijngaarden was the inaugural chair of its Nanoscience Working Group. He also helped launch a major initiative to promote physics in the Developing World. This included holding major conferences in Africa and Latin America. Another initiative was to create scholarships to support talented young researchers and also award seed money for international conferences. Of particular importance after the Sept. 11, 2001 terrorist attack on the U.S. was facilitating visas to scientists wishing to travel to international conferences held in the U.S.

1. **CHAIR of INTERNATIONAL UNION of PURE and APPLIED PHYSICS WORKING GROUP ON NANOSCIENCE (2004-2008):** This group organized two interdisciplinary meetings: NanoBioscience held in Szeged, Hungary (Sept. 2006) and Ultracold Nanomatter held at Toronto, ON (Feb. 2008).
2. **ELECTED CHAIR of COMMISSION on ATOMIC, MOLECULAR and OPTICAL PHYSICS (2002-2005):** Two of the largest meetings the International Conference on Atomic Physics and the International Conference on Electron Atom Collisions were held in Rio de Janeiro (2004), Brazil and Rosario, Argentina (2005), respectively. The Commission Chairs met annually in Trieste, Italy (2002), Mumbai, India (2003), Vancouver (2004), and Capetown, South Africa (2005).
3. **ELECTED SECRETARY OF COMMISSION ON ATOMIC, MOLECULAR AND OPTICAL PHYSICS (1999-2002)**

### NATURAL SCIENCE AND ENGINEERING RESEARCH COUNCIL (NSERC)

1. **MEMBER OF NSERC PHYSICS RESEARCH TOOLS AND INSTRUMENTS REVIEW COMMITTEE (2014-2015):** This committee ranked General Physics and Condensed Matter Equipment Grant applications.
2. **MEMBER OF GENERAL PHYSICS GRANT SELECTION COMMITTEE (2007–2009):** This committee ranked General Physics and Condensed Matter Equipment Grant applications and decided which Discovery Grants should be funded and at what level. Each year, over 100 Equipment and over 50 Discovery Grant applications were considered. The annual budget to be allocated was several million dollars.
3. **NSERC MAJOR FACILITIES ACCESS SELECTION PANEL 2005:** This Panel ranked proposals of up to several million dollars for large scale facilities in the areas of General and Condensed Matter Physics
4. **CHAIR OF GSC-29 (GENERAL PHYSICS) STEERING COMMITTEE (2000-2001):** Dr. van Wijngaarden undertook a survey of the General Physics community in Canada to determine future research priorities. An unusual high 80% of individuals responded. He was the principal author of a 17 page report to NSERC proposing a major initiative entitled "Frontiers of Photonics" encompassing Biophotonics, Environmental Monitoring and Pollution Control, Femtosecond Lasers and Synchrotron Science, High Precision Measurements, Laser Cooling and Trapping, Plasma Matter Interactions, Optical Fibers and Quantum Computing. In addition, an interdisciplinary proposal, "Paving the Future for Novel Technologies: The Science of Interdisciplinary Materials Research" was submitted jointly with the Chemistry and Condensed Matter communities. Both of these multimillion dollar proposals were ultimately successful.

## **COUNCIL OF ONTARIO UNIVERSITIES (COU)**

This organization of Ontario's 20 publicly funded universities advocates on a wide range of university issues to the provincial and federal government. A key function is to help universities deliver high-quality programs. Prior to the formation of the Higher Education Quality Council (HEQCO), the operation of each Ontario graduate program was contingent on the approval by COU's Graduate Appraisal Committee. Each Program was subject to review every 7 years. Dr. van Wijngaarden was noted for careful and thoughtful preparation and the Executive Director David Leyton-Brown invited him to serve 3 terms on this important adjudication body.

1. **SPRING MEETING of UNIVERSITY LIAISON REPRESENTATIVES (2012):** Dr. van Wijngaarden represented York University at this meeting.
2. **GRADUATE APPRAISAL COMMITTEE (2002–2005) and (SUMMER 2008):** This committee met monthly to receive referee reports and decide whether graduate programs should be renewed. Preparation for each meeting entailed reading several hundred pages of documents. A total of several hundred programs were examined over 3 years.
3. **SPECIAL COMMITTEE to APPRAISE NEW GRADUATE PROGRAMS (2006–2007):** This committee was created to handle the large influx of proposed graduate programs resulting from the large expansion of graduate education in Ontario. It met monthly and processed a total of over 100 applications.

## **AMERICAN PHYSICAL SOCIETY (APS)**

This is the world's largest and most prestigious body of physicists having over 40,000 members.

1. **THESIS PRIZE COMMITTEE:** Division of Atomic, Molecular & Optical Physics Conference of APS, Washington D.C. (April 1997) and Santa Fe (May 1998).
2. **CO-CHAIR OF CONFERENCE ORGANIZING COMMITTEE:** Division of Atomic, Molecular and Optical Physics Meeting of the American Physical Society, Toronto, May 1995. This meeting had a record of over 600 participants.

## **CANADIAN ASSOCIATION OF PHYSICISTS (CAP)**

This organization advocates for physicists in Canada and has over 1,000 members. Dr. van Wijngaarden has been actively involved most notably with the Division of Atomic and Molecular Physics. During his tenure he has served in the following capacities:

1. **NOMINATOR:** G. W. F. Drake recipient of P. Kirby Medal (2015) and A. Carswell recipient of CAP-INO Medal for Outstanding Achievement in Applied Optics (2002)
2. **MEMBER of COUNCIL of CANADIAN ASSOCIATION of PHYSICISTS (2008 – 2010)**
3. **LUMONICS PRIZE JUDGE:** Canadian Association of Physicists Congress, York (June 2000).
4. **ELECTED SECRETARY TREASURER, DIVISION of ATOMIC & MOLECULAR PHYSICS of CANADIAN ASSOCIATION of PHYSICISTS (1992-1995 and 1995-1998):** Responsibilities included recruiting members, presenting financial reports at the annual meeting, attending meetings every 6 months of the Governing Council of the Canadian Association of Physics etc.

## CONFERENCE/SYMPOSIA ORGANIZATION

1. **MODERATOR: TYNDALE COLLEGE:** “Presidential Roundtable on Academic Reform”, March, 24, 2015. Panel Participants: J. Lightstone (Brock), T. McTiernan (UOIT), R. O’Reilly Runte (Carleton) and F. Vaccarino (Guelph).
2. **PROGRAM/ORGANIZING COMMITTEE:** 2nd International Workshop on Econometric Applications in Climatology, April 23-24, 2015, Guelph, ON.
3. **MODERATOR: TYNDALE COLLEGE:** “Possibilities for Academic Reform”, March, 19, 2013. Panel Participants: C. Cooper (Dean of Science & Arts, Nipissing), D. Cassidy (Guelph) and D. Trick, author with I. D. Clark and R. van Loon of book entitled “Academic Reform: Policy Options for Improving the Quality and Cost-Effectiveness of Undergraduate Education in Ontario”.
4. **PROGRAM/ORGANIZING COMMITTEE CHAIR:** Ultracold Nanomatter, (Toronto, February 14-16, 2008). This meeting featured 20 invited speakers including Nobel Prize winners in the fields of Ultracold Quantum Degenerate Gases and Quantum Information Processes.
5. **PROGRAM COMMITTEE:** 4<sup>th</sup> International Symposium on Modern Problems of Laser Physics (Novosibirsk, August, 2004)
6. **PROGRAM COMMITTEES:** Division of Atomic and Molecular Physics Symposia at Canadian Association of Physicists Congresses in Ottawa (June 1996), Calgary (June 1997), Waterloo (June 1998), Fredericton (June 1999) & York (June 2000).
7. **PROGRAM & ORGANIZING COMMITTEE:** Meeting of Division of Atomic & Molecular Physics and Division of Optics & Photonics of Canadian Association of Physicists Congress, Ottawa, Oct. 1997.
8. **SESSION CHAIR:** SPIE Opto-Contact (July 1998 & June 2000), CAP (June 2000, & June 2002), DAMOP (May 2001).

## MEDIA INTERACTIONS

1. **DAILY MAIL UK INTERVIEW:** This resulted in an article entitled “Did exaggerated records make global warming look worse? A scientific panel organized by the Global Warming Policy Foundation will investigate whether 'adjusted' temperatures skewed data. by D... Rose (Apr. 25, 2015). Also see another article by C. Booker in **THE TELEGRAPH** (Apr. 25, 2015).
2. **TORONTO STAR INTERVIEW:** This discussed a proposed joint Program between York University and the Center for International Governance Innovation (March 1, 2012)
3. **TORONTO STAR INTERVIEW:** This resulted in a page 3 Article in Toronto Star on W. A. van Wijngaarden’s Examination of Canadian Climate Data to examine possible effect of flight ban and associated lack of jet contrails following Sept. 11, 2001 (Jan. 23, 2008)
4. **CFRB INTERVIEW:** Dr. van Wijngaarden discussed his climate research. (Jan. 23, 2008)
5. **TORONTO STAR INTERVIEW:** This resulted in a Full Page Article on Dr. W. A. van Wijngaarden’s Bose Einstein Condensation research (Nov. 20, 2005)
6. **LE SOLEIL INTERVIEW:** This discussed the Canadian Institute for Photonic Innovations, Network of Centres of Excellence announced by the Hon. S. Dion, Intergovernmental Affairs Minister, in Quebec City. This was also featured in a cover story by the NSERC magazine CONTACT. (May, 1999)

## MISCELLANEOUS

1. **ADVISE ENVIRONMENTAL SUBCOMITTEE OF U.S. HOUSE OF REPRESENTATIVES COMMITTEE ON SCIENCE, SPACE & TECHNOLOGY:** A staff member, T. Jordan, specifically requested climate change advice concerning an article by T. R. Karl et al entitled “Possible artifacts of data biases in the recent global surface warming hiatus”, June, 2015.
2. **(Invited) MEMBER GLOBAL WARMING POLICY FOUNDATION TASK FORCE:** This group examined the appropriateness of adjustments of inhomogeneities in the determination of climate change trends. April, 2015 – 2016.
3. **PROPOSAL FOR A MERIT BASED PROVINCIAL SCHOLARSHIP FOR HIGH SCHOOL STUDENTS:** It proposes high school graduates have the option of applying for a scholarship awarded based on an exam that tests knowledge in 5 equally weighted areas: English, French, History/Geography, Mathematics excluding calculus and Science. (See OpEd article, University Affairs, 2013)
4. **DEUTSCHE AKADEMISCH AUSTRACH DIENST (German Academic Exchange Service):** Dr. van Wijngaarden was selected to take part in a tour of leading southern German research centers including the Max Planck Institutes in Solid State Physics and Quantum Optics, Universities of Karlsruhe, & Darmstadt, Siemens, GSI during Dec. 2-7, 2007.
5. **SCIENCE FAIR JUDGE:** Willowdale Christian School, North York, February 1997, 1999, 2001 and St. Fidelis Separate School, North York, April 1997.
6. **STEM CLUB HOST:** Twenty five women from St. Joseph’s Morrow Park Catholic High School visited W. van Wijngaarden’s laboratory. March, 2017.

## EXTERNAL REFEREE FOR TENURE/PROMOTION

<b>Institution</b>	<b>Location</b>
Ben Gurion University	Beer-Sheva, Israel
Colby College	Waterville, Maine
McMaster University	Hamilton, ON
Ryerson University	Toronto, ON
Rutgers University	New Brunswick, New Jersey
Simon Fraser University	Vancouver, B.C.
Trent University	Peterborough, ON
University of Manitoba	Winnipeg, Manitoba
University of New Brunswick	Fredericton, N.B.
University of Ottawa	Ottawa, ON
University of Windsor	Windsor, ON

## REFEREE FOR THE FOLLOWING JOURNALS/ORGANIZATIONS

ACENet – Atlantic Canada Research Fellowship Program	Marie Curie Postdoctoral Fellowship (European Community Award)
Advances in Meteorology	Meteorology & Atmospheric Physics
Atmospheric Research	MITACS Network Centres of Excellence
Canadian Institute for Photonic Innovations	National Research Council Steacie Prize
Canadian Journal of Physics	National Science Foundation (U.S.) Major Research Instrumentation
Canadian Space Agency	NSERC Operating/Equipment Grants
Climate Dynamics	NSERC Collaborative/Research Development Award
Computer Physics Communications	NSERC J. C. Polanyi Award
Congressionally Directed Medical Research Programs	Netherlands Foundation for Fundamental Research on Matter (FOM)
Cottrell College Science Award	Open Physics Journal
European Physics Journal D	Optics Communications
Hydrological Processes	Petroleum Research Corporation
Institute for Space & Terrestrial Studies Technology Grant	Physical Review A
International Journal of Climatology	Physical Review B
International Journal of Physical Sciences	Physical Review Letters
Journal of Chemical Physics	Premier's Research Excellence Award
Journal of Climatic Change	Pure & Applied Geophysics
Journal of Geophysical Research – Atmospheres	Review of Scientific Instruments
Killam Research Fellowship	Theoretical & Applied Climatology
Manufacturing & Materials of Ontario Centre of Excellence	Nonlinear Engineering, Modelling and Application

## RESEARCH INTERESTS

### PRECISION LASER SPECTROSCOPY

Dr. van Wijngaarden's group invented a novel method to precisely measure frequency intervals. It uses a laser that is modulated using either an acousto-optic or electro-optic modulator. The frequency modulated laser beam then intersects an atomic beam. Fluorescence produced by the radiative decay of the excited atoms is detected as the laser frequency is scanned across the resonance. The resulting spectrum contains pairs of peaks separated by the modulation frequency which permits the laser frequency scan to be calibrated. The apparatus is far simpler and cheaper than using a Fabry Perot etalon to monitor the laser frequency and the results are more accurate. This technique has been used to determine Stark shifts and hyperfine splittings with accuracies up to parts in ten thousand. Most recently, our  ${}^6\text{Li}$  isotope shift measurements have permitted the determination of the relative nuclear radii with an accuracy of parts in  $10^{-18}$  meter. This constitutes one of the world's best microscopes.

### ULTRACOLD ATOMS

Laser cooling and atom trapping is one of the truly hot research topics. Interesting physics such as Bose Einstein Condensation (BEC) was first proposed by S. Bose and A. Einstein in 1924 predicting that near absolute zero, bosons (particles with integral spin) would all occupy the same state. Experimental interest was limited because no one had any idea how to achieve such ultralow temperatures. It was not until the mid 1990s after novel methods to cool atoms using lasers and store them in magnetic traps had been developed, that BEC was first observed. Dr. van Wijngaarden's group was the first in Canada to create a BEC which consisted of about  $8 \times 10^6$   ${}^{87}\text{Rb}$  atoms cooled to a temperature of 75 nK. Since then, he and his students have demonstrated how to transfer ultracold atoms between optical and magnetic traps. Most recently, they demonstrated a linear array of microtraps fabricated using the same lithographic technique as used to make computer chips. Each microtrap consists of two concentric loops having oppositely oriented currents. The inner loop radius is only 300 microns. The ultracold atoms are trapped at a distance that can be precisely controlled from 300 to less than 50 microns above the so called atom chip surface. This novel trap can be replicated to create a two dimensional array of microtraps that may be of interest to study quantum information.

### CLIMATE CHANGE STUDIES

There has been increasing concern in recent years about how humans are changing the Earth's climate. Dr. van Wijngaarden worked with scientists at Environment Canada to analyze archival data of humidity, temperature and precipitation. It is important to first examine data for inhomogeneities which may arise from changes in instruments and/or observing procedure. Most recently, Dr. van Wijngaarden studied over  $\frac{1}{4}$  billion hourly values of temperature and relative humidity observed at 309 stations located across North America during 1948-2010. Trends were found for data that did not exhibit abrupt discontinuities. Statistically significant warming trends affecting the Midwestern U.S., Canadian prairies and the western Arctic are evident in winter and to a lesser extent in spring while statistically significant increases in water vapor pressure occur primarily in summer for some stations in the eastern half of the U.S. The changes in water vapor were smaller than that found in other studies that examined far fewer data over a much shorter time span.

## RESEARCH FUNDING

Grant Title	Source	Total Amount	Years of Tenure
Entrance Scholarship	University of Windsor	4,000	1978-1982
Summer Research Fellowship	NSERC	6,000	1981-1983
Joseph Henry Scholarship	Princeton University	1,000	1982
1967 Scholarship	NSERC	68,000	1982-1986
Start Up Grant	York University	110,000	1988
Computer	President's NSERC Fund	2,000	1988
Pulsed YAG and Dye Laser	NSERC Equipment Grant	144,614	1989
Loan of YAG & Dye Laser	Ontario Laser Lightwave Research Center		1990
Atomic Physics with Lasers	NSERC Operating Grant	84,000	1989-1991
Atomic Physics with Lasers	NSERC Operating Grant	90,000	1992-1994
Laser Spectroscopy of Atoms	NSERC Operating Grant	113,570	1995-1998
Argon Ion Laser Tube	NSERC Equipment Grant	28,100	1995
Acousto-Optic Modulator	President's NSERC Fund	2,000	1995
Diode Laser	NSERC Equipment Grant	16,892	1996
Dye Laser Computer Interface	NSERC Equipment Grant	18,682	1997
Donation of Pressure Controller	Varian Canada	2,000	1997
Two Diode Laser Systems	NSERC Equipment Grant	31,813	1999
High Precision Spectroscopy	NSERC Operating Grant	252,00	1999-2004
Network of Centres of Excellence Preparation Grant	Industry Canada	25,000	1998



Network of Centres of Excellence Preparation Award	York University	15,500	1998
Frequency Synthesizer	Minor Research Grant	1,496	1999
General Physics Steering Committee	NSERC	23,000	2001
Canadian Institute for Photonic Innovations Network Centers of Excellence	Industry Canada	22,833,900 <sup>1</sup>	1999-2001
Argon Ion Laser Tube	NSERC Equipment Grant	37,075	2002
50-75 GHz Microwave Source	NSERC Equipment Grant	56,030	2003
Digital Oscilloscope Rental	Minor Research Grant	1,500	2005
Applied Precision Laser Spectroscopy	NSERC Discovery Grant	468,000	2005-2011
TITAN: TRIUMF Ion Trap for Atomic & Nuclear Science	NSERC	1,860,000 <sup>2</sup>	2003-2005
Travel & Accommodation for 7 Workshops	Canadian Institute for Advanced Research		2005-2012
Ultracold NanoMatter Conference	International Union of Pure & Applied Physics	12,000	2006-2007
Argon Ion Laser	NSERC Equipment Grant	116,059	2007
Atom Chip Fabrication	CMC Microsystems	14,950	2007
MOT Vacuum Chamber	Minor Research Grant	2,368	2010
Fast Switchable Power Supply	Minor Research Grant	1,368	2012
Atomic Physics with Lasers	NSERC Discovery Grant	125,000	2012-2016
Fabrication of Microtrap Array Atom Chip	CMC Microsystems	1,200	2013
Research Travel Grant	Minor Research Grant	990	2014
Climate Change Physics, Precision Laser Spectroscopy & Ultracold Atom Microtraps	NSERC Discovery Grant	126,000	2017-2022

1. W. van Wijngaarden's portion was \$427,530 for research and \$115,000 for administration

2. W. van Wijngaarden's portion was \$27,000

# TRAINING AND SUPERVISION OF HIGHLY QUALIFIED PERSONNEL

## B.Sc. UNDERGRADUATES

A. Gambhir (2022)	“Monte Carlo Calculation of Cloud Layer Reflectance for Isotropic, Rayleigh & Forward Scattering”
P. Teeloku (2020-2021)	“Atmospheric Absorption of Solar Radiation”
K. Othayoth (2019-2020)	“Calculation of Atmospheric Temperature Profile using Pseudoadiabatic Lapse Rate”
N. Serov (2018-2019)	“Radiative Transfer in Earth’s Atmosphere”
P. Gemayel (2018)	“Solar Absorption by Greenhouse Gases”
E. Yaraghi-Esfahani (2016)	“Optical Coherent Tomography”
A Mouraviev (2015-2016)	“Calculation of Magnetic Fields for a Microtrap of Ultracold Atoms”
A Syed (2014-2015)	“Changes in Global Annual Precipitation from the 18 <sup>th</sup> Century to 2013”
O. Rezania (2014 – 2015)	“Assistant in Precision Laser Spectroscopy Laboratory”
B. Ryu (2013-2014)	“Website construction using WORDPRESS”
T. Cazes (2012-2013)	“Testing of Microwave Cavity”
I. DeSouza (2011-2012)	“Loading Atoms into a Microtrap Array”
N. Bezginov (2010-2011)	“Modelling of Ion Beam Passing through an Einzel Lens”
U. Bindra (2010)	“Analysis of Hourly Temperature Measurements to Detect Climate Change”
A. Vijaratnam (2009-2010)	“Laser Excitation of Lithium Ion Beam”
V. Isaac (2009-2010)	“Analysis of Hourly Temperature and Humidity measurements in North America 1948-2010”
A. Sibilia (2009)	“Study of Surface Magneto Optical Trap”
R. Moscaritolo (2008-2009)	“Lithium Ion Spectroscopy”
E. Chemali (2008-2009)	“Construction of Surface Magneto-Optical Trap”
O. Murray (2008)	“Construction of Apparatus for Laser Spectroscopic Experiment”
I. Corlett (2004)	“Modelling of Current Configurations to create a Microtrap”

J. Pinchefsky (2001)	“Computer Modelling of Magnetic Fields”
A. Johnson (2000)	“Frequency Locking of Laser Diodes”
S. Cauchi (2000-2001)	“Studies of Laser Cooled Atoms”
G. Karkas (2000)	“Construction of Vacuum System”
Y. Soudagar (1999–2000)	“Assistant in Laser Spectroscopy Laboratory”
J. Crandall (1999)	“Construction of Website for Canadian Institute of Photonic Innovations”
G. Hajdok (1999)	“Laser Spectroscopy of Li <sup>+</sup> ”
I. Duda (1992)	“Hyperfine Measurements using Level Crossing Spectroscopy”
J. Koh (1990-1991)	“Quantum Beat Spectroscopy”
M. van Leeuwen (1989-1990)	“Construction of Vacuum System for Laser Isotope Separation”

### **M.Sc. STUDENTS**

M. Boyd (2016-2018)	“Effect of Hole Size on Leakage of Power from a Microwave Buildup Cavity”
Y. de Hang (2013-2015)	“Calculation of the Microwave Power required for an Optical Double Resonance Experiment to measure the Hyperfine Splittings of the $^{6,7}\text{Li}^+ 1s2p\ ^3\text{P}_{1,2}$ States”  Mr. Yang calculated the microwave power required for $^{6,7}\text{Li}^+$ to undergo a transition between two hyperfine levels of the $1s2p\ ^3\text{P}_{1,2}$ states.
J. Wang, (2011-2013)	“Construction and Characterization of a Microwave Cavity for an Optical Double Resonance Experiment”  Mr. Wang built and tested a microwave cavity resonant at 4.2 GHz which coincides with a transition between two hyperfine levels of the Li <sup>+</sup> ion. He is presently employed by an Environmental Monitoring company in China.
E. Chemali, (2009-2011)	“Characterization of Metastable Li Ion Source”  Mr. Chemali tested a source that generates lithium ions by colliding electrons with an atomic beam. After graduation, he worked at Moose Power, an innovative solar panel energy company, before returning to do his Ph.D. in Engineering at McMaster University.

G. Humphrey, (2006-2009) “Frequency Stabilization of a 1092 nm Diode Pumped Fiber laser and a 1033 nm External Cavity Diode laser for use in an Optical Atomic Clock based on a  $^{88}\text{Sr}^+$  Single Ion”

Mr. Humphrey worked in our lab for a year before going to the National Research Council where he was supervised by Dr. A. Madej. He is presently the undergraduate laboratory coordinator in the Physics Department at the University of Toronto Mississauga campus.

A. Shiner, (2004-2006) “Development of a Frequency Stabilized 422 nm Diode Laser System and its Application to a  $^{88}\text{Sr}^+$  Single Ion Optical Frequency Standard”

Mr. Shiner worked in our lab for a year before going to the National Research Council where he was supervised by Dr. A. Madej. After graduation he left to do a Ph.D. at the University of Ottawa.

J. Yang (2004) “Studies of Bose Einstein Condensation” (incomplete)

R. Ashby, (2001-2003) “Fine Structure and Polarizabilities of the  $^6\text{Li } 3D_{3/2,5/2}$  States”

Mr. Ashby precisely measured the stark shifts in neutral lithium. He is presently employed at Spectra Applied Research in Toronto.

J. Walls, (2000-2001) “Lithium D Line Spectroscopy”

Mr. Walls worked on a project that improved the accuracy of hyperfine and fine structure intervals in neutral lithium by over an order of magnitude. After graduation he obtained a Ph.D. in biophysics from the University of Toronto. He presently works for Regeneron Pharmaceuticals.

N. Davis, (1998-2001) “Cesium Magneto-Optical Trap”

Mr. Davis constructed one of Canada’s first magneto-optical traps. He is presently a High School Physics teacher.

J. Xia, (1996-1998) “Stark Shifts of the Cesium  $6P_{3/2} - (10-13)D_{3/2,5/2}$  Transitions”

Mr. Xia worked on a project that precisely measured polarizabilities of cesium excited states to better than one part in a thousand.

B. Medicky (1993) “Studies of Cesium Polarizabilities” (incomplete)

J. L. Sagle, (1989-1991) “Measurement of Hyperfine Structure of Excited Alkali States”

Mr. Sagle worked on a project that measured the excited state hyperfine structure using level crossing and quantum beat spectroscopy. After graduation he obtained a Ph.D. from Lehigh University before joining that faculty at Rowan University, New Jersey.

## Ph.D. STUDENTS

- B. Jian (2009-2014) “Development of an Atom Chip for Studying Ultracold Atoms”
- Mr. Jian worked to develop an array of microtraps and showed how they could be loaded from atoms using a Far Off Resonance Trap, a surface Magneto Optical Trap or a conventional MOT. The microtrap consists of two concentric microwire loops deposited onto a chip using lithographic fabrication.
- B. Schultz, (2005-2010) “Precision Measurement of Rb D2 Natural Linewidth”
- Mr. Schultz worked on an experiment that scanned a probe laser across the resonance observed using an ultracold rubidium atom. The result has an accuracy of better than 1% and is a novel way to determine the excited state lifetime. He is presently a research associate at TRIUMF at the University of British Columbia.
- G. Noble, (2003-2009) “Isotope Shifts and Fine Structure of Li D Lines and Determination of  $^{6,7}\text{Li}$  Relative Nuclear Charge Radius”
- Mr. Noble worked on an experiment that was able to determine the relative nuclear charge radius of  $^{6,7}\text{Li}$  to less than  $1 \times 10^{-17}$  meter. He is presently the holder of a MITACS postdoctoral fellowship at Ryerson University.
- J. J. Clarke, (1997-2002) “Measurement of Hyperfine and Fine Structure Splittings of  $\text{Li}^+ 1s2s \ ^3S - 1s2p \ ^3P$  Transition”
- Mr. Clarke worked on an experiment that resolved a discrepancy between two other groups that measured fine structure intervals in  $\text{Li}^+$ . After graduation, he worked for MDS Sciex.
- C. Munoz-Goetz (1997) “Studies of Laser Spectroscopy” (incomplete)
- J. Li, (1990-1996) “Hyperfine Splittings Isotope & Stark Shifts of  $\text{Yb } (6s)^2 \ ^1S_0 - (6s6p) \ ^3P_1$  Transition using an Acousto-optically Modulated Laser Beam”
- Mr. Li worked on an experiment that developed a novel way to precisely measure frequency intervals that used a laser beam that as frequency modulated by an acousto or electro-optic modulator. He is presently working at KLA Tencor in San Jose, California.

## POSTDOCTORAL FELLOWS AND RESEARCH ASSOCIATES

- P. Zhao (2009-2010) Dr. Zhao worked on a project to load ultracold atoms into a microtrap. He is presently a college instructor in China.
- H. Ming (2004–2006) Dr. Ming demonstrated how to transfer atoms from a so called QUIC magneto trap into an optical trap. After leaving our group, he worked at the Niels Bohr institute in Copenhagen, Denmark. He is presently Research Professor at Wuhan Institute of Technology in China.
- B. Lu (2001-2004) Dr. Lu constructed Canada’s first Bose Einstein Condensation apparatus. He is presently Research Professor at Wuhan Institute of Technology in China.
- X. Liu (2000) Dr. Liu worked on a project to laser cool and trap rubidium atoms.
- H. Chen (2000) Dr. Chen worked on several projects including electromagnetically induced transparency for use in optical switching as well as laser cooling and atom trapping. After leaving our group, he worked at EXFO, a telecommunications company in Quebec City.

## EXTERNAL EXAMINER

<b>Year</b>	<b>Student</b>	<b>Degree</b>	<b>Institution</b>
2002	H El-Refaei	Ph.D.	Queen’s University
2003	I A. MacAskill	Ph.D.	University of Windsor
2007	A. Das	Ph.D.	University of Bangalore
2012	I Stotz	Ph.D.	Trent University
2012	T. Kong	Ph.D.	University of British Columbia
2013	S. Kidwai	Ph.D.	University of Manitoba
2013	L. Ugray	M.Sc.	Trent University
2019	R. Dumke	Ph.D.	Nanyang Technical University
2019	J. Dech	Ph.D.	University of Windsor

## THESIS SUPERVISORY/DEFENSE COMMITTEES

<b>Year</b>	<b>Student</b>	<b>Degree</b>	<b>Supervisor</b>
1990	G. Cunningham	Ph.D.	A. Carswell
1991	Z. Chen	Ph.D.	H. Freedhoff
1991	P. Hircock	Ph.D.	J. Laframboise (failed to complete)
1991	J. Liakos	Ph.D.	M. Horbatsch
1991	B. Pogue	M.Sc.	J. O'Neill
1991	J. Sagle	M.Sc.	W. A. van Wijngaarden
1991	L. Sonmor	Ph.D.	J. Laframboise
1991	D. Thompson	Ph.D.	B. Lever
1991	T. Zhang	Ph.D.	R. Koniuk
1992	M. Lambert	Ph.D.	S. Filseth
1992	S. Mihailov	Ph.D.	W. Duley
1992	L. Pateopol	M.Sc.	J. O'Neill
1993	Y. He	M.Sc.	W. Frisken
1994	Z. Jin	Ph.D.	D. Stynes
1994	J. Whiteway	Ph.D.	A. Carswell
1995	J. Li	Ph.D.	W. A. van Wijngaarden
1996	M. Cardy	M.Sc.	S. Bhadra
1996	P. Fagerstroem	M.Sc.	S. Bhadra
1996	C. J. da Cunha	Ph.D.	B. Lever
1997	M. Ebadi	M.Sc.	B. Lever
1998	J. Xia	M.Sc.	W. A. van Wijngaarden
1998	A DelMedico	Ph.D.	B. Lever
1999	C Story	Ph.D.	C. Hessels
2000	J. McMahan	Ph.D.	J. Laframboise
2001	N. Davis	M.Sc.	W. A. van Wijngaarden
2001	J. Walls	M.Sc.	W. A. van Wijngaarden
2002	J. J. Clarke	Ph.D.	W. A. van Wijngaarden
2002	C Wang	Ph.D.	J. Laframboise (failed to complete)
2003	R. Ashby	M.Sc.	W. A. van Wijngaarden

<b>Year</b>	<b>Student</b>	<b>Degree</b>	<b>Supervisor</b>
2003	M. George	M.Sc.	E. Hessels
2004	J. Yang	M.Sc.	W. A. van Wijngaarden (failed to complete)
2006	D. Kalinina	M.Sc.	B. Lever
2006	D. Shiner	M.Sc.	A. Madej/W. A. van Wijngaarden
2008	I. Burling	Ph.D.	G Harris
2009	L. Lombardi	Ph.D.	D. Hessels
2010	G. Noble	Ph.D.	W. A. van Wijngaarden
2010	G. Humphrey	M.Sc.	A. Madej/W. A. van Wijngaarden
2010	G Shore	Ph.D.	M. Organ
2010	B. Schultz	PhD.	W. A. van Wijngaarden
2010	M. Khanfar	Ph.D.	S. Morin
2010	G. Yao	Ph.D.	M. Organ
2010	M. Saini	M.Sc.	S. Morin
2011	E. Chemali	M.Sc.	W. A. van Wijngaarden
2011	E. Giri	M.Sc.	M. Organ
2011	E. Liu	Ph.D.	S. Morin
2012	E. Dodgson	M.Sc.	S. Krylov
2012	N. Yordanov	M.Sc.	G. Harris
2013	J. Wang	M.Sc.	W. A. van Wijngaarden
2013	M. Hariri	M.Sc.	S. Morin
2014	B. Jian	Ph.D.	W. A. van Wijngaarden
2014	S. Zahedi Jasbi	Ph.D.	S. Morin
2015	F. Yang	M.Sc.	W. A. van Wijngaarden
2015	L. McCann	Ph.D.	M. Organ
2016	A. Dumont	M.Sc.	S. Morin
2018	M. Boyd	M.Sc.	W. A. van Wijngaarden
2018	A Khadra	Ph.D.	M. Organ
2018	Y. Alfayfi	Ph.D.	R. Lee
2018	C. Schruder	Ph.D.	W. Pietro
2019	S. Oboudi	Ph.D.	S. Morin (failed to complete)



<b>Year</b>	<b>Student</b>	<b>Degree</b>	<b>Supervisor</b>
2019	M. Wiebe	M.Sc.	G. Lavoie
2022	B. Doan	M.Sc.	A. Orellano

## TEACHING

Dr. van Wijngaarden has taught over 100 one semester courses plus dozens of tutorials during his 25 years at York. He has taught at all undergraduate levels as well as to graduate students. A number of these courses have been given on unpaid overload. His teaching encompasses an incredible breadth of subjects including: Linear Algebra, Introductory Calculus, Introductory Physics, Electricity & Magnetism, Electrodynamics I, Electrodynamics II, Advanced Classical Mechanics, Modern Physics, Laser Electronics, Optics, Solid State Physics, Relativistic Quantum Mechanics, General Relativity and Atomic Physics.

### PEDAGOGICAL TECHNIQUE

- METICULOUS PREPARATION:** A considerable time is spent to write immaculate lecture notes that read better than any textbook. Work is also done to create original interesting assignment problems. A number of colleagues (J. Burt, M. George, E. Hessels, R. McEachran, S. Jeffers) have used Dr. van Wijngaarden's notes in their teaching.
- VERY LUCID LECTURES:** Dr. van Wijngaarden is known to explain things very clearly beginning from basic definitions. When something is difficult, he slows down. Questions are asked to ensure students grasp the material. The use of humour before introducing a particularly difficult concept also ensures the student's undivided attention.
- EFFECTIVE CLASSROOM MANAGEMENT:** Students regularly comment that unlike most other classes, distractions due to chatting students, neighbouring students browsing inappropriate websites, cell phone use etc. do not occur in Dr. van Wijngaarden's classes. A colleague entering a Phys 1410 lecture commented that students certainly were paying attention.
- TEACHING/LAB ASSISTANTS:** Graders receive assignment/quiz solutions along with a clear, straight forward grading scheme. Lab assistants are required to do each experiment themselves and show Dr. van Wijngaarden their writeup as though they were a student.
- MOTIVATIONAL MARKING SCHEME:**
  - Weekly Assignments/Quizzes** are marked and returned promptly usually by the next lecture.
  - Posting Assignment/Quiz Solutions on Website.** Dr. van Wijngaarden was one of the first at York to make his own website to post solutions.
  - Dropping Lowest Assignment/Quiz:** This encourages students all is not lost because of one low mark.
  - Substantial Final Exam:** The final exam should be worth at least 40% of the course grade to help students whose term mark is lower than desired.
  - Final Mark Round Up:** York University assigns letter grades i.e. A+ for a mark  $\geq 90\%$  etc. Dr. van Wijngaarden tells each class that he is too cheap to replace his defective calculator that automatically rounds a mark of 89% to 90%, 79% to 80% etc. This avoids considerable frustration for students and enhances their confidence that they are fairly treated.
- UNLIMITED OFFICE HOURS:** Dr. van Wijngaarden's office door is always open from early in the morning to late in the afternoon. The only criteria for getting help with a homework problem is a student must first show they have made a serious attempt to do it themselves.
- GRADUATE COURSES:** Enrollments are typically small and Dr. van Wijngaarden distributes the course lecture notes. Students are expected to read the notes before each lecture. This allows more material to be covered and special attention to be devoted to particularly challenging areas.
- HIGH STANDARDS:** Dr. van Wijngaarden encourages each student to maximize their potential. He tells the class: "There is no shame in getting a C if you have done your best. However, if you were lazy and get a B+ you should work harder." Learning good work habits helps students throughout their career.

## COURSES TAUGHT

<b>Course Number</b>	<b>Title</b>
ACMS 1050.06	Mathematics for Biological Sciences
ACMS 1025.03	Linear Algebra
PHYS 1410.06	Physical Science
PHYS 1510.04	Introductory Physics
PHYS 2020.03	Electricity & Magnetism
PHYS 2060.03	Optics
PHYS 3010.03	Advanced Classical Mechanics
PHYS 3020.03	Electrodynamics I
PHYS 3030.03	Electrodynamics II
PHYS 3040.06	Modern Physics
PHYS 4011.03	Atomic Physics
PHYS 4020.03	Electrodynamics II
PHYS 4050.03	Solid State Physics
PHYS 4310.03	Physics Projects Course
PHYS 5000.03	Relativistic Quantum Mechanics
PHYS 5020.03	Hydrodynamics
PHYS 5050.03	Advanced Atomic Physics
PHYS 5110.03	Quantum Electronics
PHYS 5230.03	General Relativity
PHYS 6060.03	Advanced Topics in Atomic Physics
PHYS 6110.03	Advanced Topics in Quantum Electronics

## TEACHING ASSIGNMENTS

Year	Course	Title
1988-1989	ACMS 1050.06 PHYS 4020.03	Mathematics for Biological Sciences (Lecture + 2 Tutorials) Electrodynamics II
1989-1990	PHYS 2020.03 PHYS 3020.03 PHYS 4020.03	Electricity & Magnetism (Lecture + Tutorial) Electrodynamics I Electrodynamics II
1990-1991	PHYS 2020.03 PHYS 3020.03 PHYS 4020.03 ACMS 1050.06	Electricity & Magnetism (Lecture + Tutorial) Electrodynamics I Electrodynamics II (1/2) Math for Biological Sciences (Lecture + Tutorial)
1991-1992	PHYS 2020.03 PHYS 3020.03 MATH 1505.06 PHYS 5110.03	Electricity & Magnetism (Lecture + Tutorial) Electrodynamics I Mathematics for Biological Sciences (Lecture + 2 Tutorials) Quantum Electronics
1992-1993	PHYS 2020.03 PHYS 6110.03 MATH 1505.06	Electricity & Magnetism (Lecture + Tutorial) Advanced Topics in Quantum Electronics Mathematics for Biological Sciences (Lecture + 2 Tutorials)
1993-1994	PHYS 6060.03 PHYS 4050.03 MATH 1505.06	Atomic Physics Solid State Physics Mathematics for Biological Sciences (Lecture + 2 Tutorials)
1994-1995	Sabbatical	
1995-1996	PHYS 5000.03 PHYS 4050.03 PHYS 3010.03 PHYS 3020.03	Relativistic Quantum Mechanics Solid State Physics Advanced Classical Mechanics Electrodynamics I
1996-1997	MATH 1505.06 PHYS 3020.03 PHYS 5110.03	Math for Biological Sciences (Lecture, Tutorial + 2 MathLabs) Electrodynamics I (Lecture + Tutorial) Quantum Electronics
1997-1998	PHYS 3010.03 PHYS 4020.03 PHYS 6060.03 PHYS 6110.03 MATH 1505.06	Advanced Classical Mechanics Electrodynamics II Atomic Physics Advanced Topics in Quantum Electronics Mathematics for Biological Sciences (2 Tutorials)

1998-1999	MATH 1505.06 PHYS 3010.03 PHYS 5050.03	Mathematics for Biological Sciences (Lecture + 1.5 Tutorials) Advanced Classical Mechanics Atomic Physics
1999-2000	MATH 1025.03 PHYS 3010.03	Linear Algebra (Lecture + Tutorial) Advanced Classical Mechanics
2000-2001	PHYS 5110.03 MATH 1505.06 PHYS 5230.03	Quantum Electronics Mathematics for Biological Sciences (1 Tutorial) General Relativity
2001-2002	PHYS 5110.03 MATH 1025.03 MATH 1505.06	Quantum Electronics Linear Algebra (Lecture + 2 Tutorials) Math for Biological Sciences (Lecture + Tutorials)
2002-2003	MATH 1025.03 PHYS 4020.03	Linear Algebra (2 Sections + 2 Tutorials) Electrodynamics II
2003-2004	PHYS 5110.03 ½ yr Sabbatical	Quantum Electronics
2004-2005	PHYS 3040.06 PHYS 4050.03	Modern Physics Solid State Physics
2005-2006	PHYS 6110.03 MATH 1014.03 PHYS 5000.03	York University Research Development Fellowship Advanced Topics in Quantum Electronics Introductory Calculus (2 Tutorials) Relativistic Quantum Mechanics
2006-2007	PHYS 1410.06 PHYS 3010.03 PHYS 4020.03	Physical Science (First Semester) Advanced Classical Mechanics Electrodynamics II
2007-2008	PHYS 3040.06 PHYS 5000.03 PHYS 5110.03 PHYS 3010.03 PHYS 4020.03 PHYS 4310.03	Mathematics for Modern Physics (8 lectures) Relativistic Quantum Mechanics Quantum Electronics Advanced Classical Mechanics Electrodynamics II Physics Project Course
2008-2009	PHYS 2060.03 PHYS 3020.03 PHYS 4050.03 PHYS 1410.06 PHYS 1410.06 PHYS 1410.06	Optics (filling in for 1/3 course) Electrodynamics I (filling in 1/4 course) Solid State Physics Physical Science (1 Tutorial) Physical Science (Summer Session) Physical Science (2 Tutorials Summer Session) ½ yr Sabbatical

2009-2010	PHYS 1410.06 PHYS 1419.06 PHYS 1510.04 PHYS 1510.04 PHYS 4050.03 PHYS 5100.03 PHYS 5110.03	Physical Science Tutorials Introductory Physics One Tutorial (Summer Session) Solid State Physics Graduate Solid State Physics Quantum Electronics
2010-2011	PHYS 5110.03 PHYS 4310.03 PHYS 1410.06	Quantum Electronics Project Physics Course Physical Science (1 Tutorial)
2011-2012	PHYS 1510.04 PHYS 1510.04 PHYS 3020.03 PHYS 3020.03 PHYS 5110.03	Introductory Physics Introductory Physics (1 Tutorial Summer Session) Electrodynamics I Electrodynamics I (1 Tutorial) Quantum Electronics
2012-2013	PHYS 1410.06 PHYS 1419.06 PHYS 4050.03 PHYS 5100.03 PHYS 6110.03	Physical Science (Summer Session) Physical Science (2 Tutorials) Solid State Physics Graduate Solid State Physics Advanced Topics in Quantum Electronics
2013-2014	PHYS 1410.06 PHYS 1419.06 PHYS 3010.03 PHYS 3010.03 PHYS 4050.03 PHYS 5100.03 PHYS 5110.03	Physical Science (Summer Session) Physical Science (2 Tutorials) Advanced Classical Mechanics Advanced Classical Mechanics (1 Tutorial) Solid State Physics Graduate Solid State Physics Quantum Electronics
2014-2015	PHYS 1510.04 PHYS 1510.04 PHYS 1410.06 PHYS 1410.06 PHYS 3030.03 PHYS 4050.03 PHYS 5100.03 PHYS 5110.03 PHYS 6110.03	Introductory Physics (Summer Session) Introductory Physics (1 Tutorial) Physical Science (First Half) Physical Science (1 Tutorial) Statistical Mechanics Solid State Physics Graduate Solid State Physics Quantum Electronics Advanced Topics in Quantum Electronics
2015-2016	Sabbatical	
2016-2017	PHYS 1410.06 PHYS 1410.06 PHYS 1401.06 PHYS 4011.03 PHYS 5110.03	Physical Science Physical Science Tutorials Lab Coordinator Atomic Physics Quantum Electronics

2017-2018	PHYS 1410.06 PHYS 1410.06 PHYS 2060.03 PHYS 4020.03 PHYS 5020.03	Physical Science Physical Science (1 Tutorial + Lab Coordinator) Optics (Lecture + Tutorial) Electrodynamics II Hydrodynamics
2018-2019	PHYS 2060.03 PHYS 3010.03 PHYS 4020.03	Optics (Lecture + Tutorial) Advanced Classical Mechanics Electrodynamics II
2019-2020	PHYS 4020.03 PHYS 4050.03 PHYS 5100.03 PHYS 5020.03	Electrodynamics II Solid State Physics Graduate Solid State Physics Hydrodynamics
2020-2021	PHYS 4020.03 PHYS 4050.03 PHYS 5100.03 PHYS 5110.03	Electrodynamics II Solid State Physics Graduate Solid State Physics Quantum Electronics
2021-2022	PHYS 4050.03 PHYS 4120.03 PHYS 5030.03	Solid State Physics Gas & Fluid Mechanics Graduate Statistical Mechanics
2022-2023	PHYS 4120.03 ½ year sabbatical	Gas & Fluid Mechanics

## **TEACHING EFFECTIVENESS**

Students have a very high regard for Dr. van Wijngaarden's classroom organization and comment they learn far more in his courses than elsewhere. During the summer of 2013, a student in Phys 1410.06 said "I wish my McMaster professors taught like you". Many instructors have informally sought his advice. In 2005, he was asked to give a seminar, "Insight into Teaching Physics" to the Physics and Astronomy graduate students. Several long time faculty members were also in attendance. In August, 2013, Dr. van Wijngaarden was asked to be a panel participant at the Orientation Workshop of new faculty members at York University. Vice Provost Pitt specifically asked him to mention his recent experience teaching introductory Physics to nonphysics majors. In May 2013, he began Phys 1410.06 with 150 students on the first day. Three months later, 140 passed the course and 1/3 received either an A or A+. It should be noted that in previous years the Phys 1410 exam was also given to 4<sup>th</sup> year Honours Physics students who performed miserably. This success rate is unheard of even when one takes into account an additional 10 students who dropped the course and were replaced by latecomers.

## **ANONYMOUS STUDENT EVALUATION COMMENTS**

### **ACMS 1050/MATH 1505: Calculus for the Biological Sciences**

Prof. van Wijngaarden is an excellent teacher. He was always on time and made himself available evenings, when tests were scheduled. The evaluation marks are very fair. Tests were all reflective of homework assignments. I'm pleased with the effort put into the course by Prof. van Wijngaarden.

Excellent, Dr. van Wijngaarden is an amazing lecturer. His notes are clear i.e. examples for everything he taught.

The professor was very responsive to all the questions, even though some were stupid (but he did not show that).

The lecturer was always available for extra, extra help outside the class hours and outside the designated tutorial hours. He was even available in the evening (7:00 – 10:00 pm).

### **PHYS 2020: Electricity and Magnetism**

Dr. van Wijngaarden truly wants his students to do well and no matter what you know you're E & M when you finish. Go for help if you need it. He is always available and pleasant.

Probably learned more in this course than in the rest of my courses put together. At the same time it was always fair. Gives people a chance to do well.

As far as I am concerned this was the best-taught course I have attended since I study at York. I believe that other teachers should learn from his teaching capabilities and adapt his methods. He made the material more interesting than it already was to me!

Fabulous teacher. Interesting course. Was able to provide an extra test to raise class average.

I think we should call up the head of Biology and get him/her to clone Dr. van Wijngaarden so that he can teach all the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> year physics courses, and possibly some of the computer ones.



### **PHYS 3010: Classical Mechanics**

I feel Dr. van Wijngaarden is an excellent prof with high standards we should all aim for and I think that I would like to have him again, as I learned a lot in his course. Thank you.

### **PHYS 3020: Electrodynamics I**

Professor Wijngaarden is an excellent teacher with a good sense of humour. He is well versed in the subject matter and is able to pass it on in a clear and concise manner.

The professor (W. van Wijngaarden) was great! He would help the students at any time and wanted the students to do well, always.

Dr. van W. should teach all other professors how to organize and present their lectures.

### **PHYS 4020: Electrodynamics II**

Just peachy, an excellent course.

Far exceeded expectations, terrific course and very good professor!

Simply put, V.W. is one of the best Profs in the department.

### **PHYS 4050: Solid State Physics**

I think this course provided an excellent introduction into Solid State Physics. Dr. van Wijngaarden is an excellent lecturer who welcomes students with problems and enjoyed teaching the course (it showed!)

The professor is very knowledgeable and shows enthusiasm for this course, which makes it more interesting. Structure of course is very nice, i.e. students are not note takers for an hour every day of class and thus, discussion on material is made possible. Just one more thing “Keep up the fine work Dr. van Wijngaarden”.

### **PHYS 4100/5110: Quantum Electronics**

Dr. van Wijngaarden is a very knowledgeable prof. The course was interesting and worthwhile. I think that more undergrads should be encouraged to take this course.

I found it very interesting and have learned a lot. I agree with Dr. van Wijngaarden’s stressing of understanding the physics, not getting bogged down in the algebra.

### **PHYS 5000: Relativistic Quantum Mechanics**

This was a very good course in providing a fundamental knowledge of physics that grad students should know.

It was nice to see theoretical complexity simplified by using a strong experimental theme.

### **PHYS 6060: Atomic Physics**

I anticipated a fast pace course as it turned out to be. I like the fact that little to no time was wasted on formulae and useless math.

## MISCELLANEOUS REPORTS/ARTICLES

1. Methane and Climate, W. A. van Wijngaarden and W. Happer, published by CO<sub>2</sub> Coalition, **2019**.
2. *Physics is Really Fun!!!?*, edited Lab Manual, Physics 1410, York University, March 17, **2017**, 118 pages.
3. *Report to Global Warming Policy Foundation*, **2015**, “Analysis of Australian Temperature Data from 1856 to 2014”, 19 pages.
4. Op Ed Article: **2013**, “Rewarding True High School Academic Excellence”: A Proposal for a Merit Based Provincial Scholarship based on result of Examination, *University Affairs*, Sept. Issue.
5. *Working Group on External Partnerships Report*, submitted to Senate, York University, Feb. 28, **2013**, 30 pages
6. *Equity SubCommittee Report*, submitted to Senate Executive Committee, May 1, **2012**, 50 pages.
7. *Report on Faculty of Science & Engineering Technical Shops*, written with W. Pietro, submitted to Dean Kozinski, May 10, **2010**, 47 pages.
8. *Physics is Fun!!!*, Lab Manual, Physics 1510, York University, Apr. 26, **2010**, 15 pages.
9. *Investigation of hourly records of temperature, dew point, relative humidity and specific humidity for the analysis of climate trends*, submitted to Environment Canada, 1<sup>st</sup> Interim Report, Nov. 15, **2004**, 68 pages, 2<sup>nd</sup> Interim Report, March 15, **2005**, 18 pages, 3<sup>rd</sup> Interim Report, June 15, **2005**, 35 pages.
10. *General Physics (GSC-29) Reallocations Submission to NSERC*, Dec. 31, **2001**, 17 pages.
11. *General Physics GSC-29 NSERC Steering committee Survey*, April 5, **2000**, 9 pages.
12. *Technology Transfer Survey*, Canadian Institute for Photonic Innovations, Sept. 25, **2000**, 12 pages.
13. “Research and Career Opportunities in Photonics”, Canadian Institute for Photonic Innovations, Dec., **1999**, 48 pages.

## BOOKS

1. “Is Global Warming Hot Air?”, W. A. van Wijngaarden, 153 pages **2016**.
2. Review of “UNSETTLED” by S. Koonin, **2022**.

## MISCELLANEOUS TALKS

1. “Is Global Warming Hot Air?”, Brentwood Library, March **2018**.
2. “Climate Change: What on Earth is Going On?”, North York Physics Group, October, **2018**.
3. “Climate Change: What on Earth is Going On?”, Barrie Rotary Club, November, **2018**.

## YORK TALKS

1. “Is Global Warming Hot Air?”, *Integrated Science 1210 Guest Lecturer*, October, **2018**.
2. “Climate Change: What on Earth is Going On?”, *McLaughlin College*, February, **2018**.
3. “Radiative Transport in the Earth’s Atmosphere”, *Physics & Astronomy Department*, February, **2018**.
4. “Is Global Warming Hot Air?”, *NATS1840 Invited Guest Lecturer*, August, **2015**.
5. “Precision Spectroscopy of Li”, *Physics & Astronomy Department*, April, **2015**.
6. “Is Global Warming Hot Air?”, *Physics & Astronomy Department*, April, **2015**.
7. “Is Global Warming Hot Air?”, *NATS 1730 Guest Lecturer*, January, **2015**.
8. “Is Global Warming Hot Air?”, *McLaughlin College*, November, **2014**.
9. Panel Participant in Advice for New Faculty, *Orientation Workshop*, August 27, **2013**.
10. “Fun with Ultracold Atoms”, High School Teacher Evening, *Physics & Astronomy Department*, November, **2010**.
11. “Fun with Ultracold Atoms”, *Physics & Astronomy Department*, November, **2009**.
12. “Climate Trends in Canada during the past half Century”, Calumet College, November, **2007**.
13. “Insights into Teaching Physics”, *Physics & Astronomy Graduate Student Seminar*, November, **2005**.
14. “Relative Humidity Trends in Canada”, *Physics Club Talk*, February, **2004**.
15. “Bose Einstein Condensation in a QUIC Trap”, *Physics & Astronomy Seminar*, February **2004**.
16. “Examination of Hourly Relative Humidity Data in Canada during 1953-2003”, *Center for Atmospheric Chemistry*, November, **2003**.
17. “Precision Hyperfine and Fine Structure Measurements of  ${}^6,7\text{Li}^+ 1s2s {}^3\text{S}$  and  $1s2p {}^3\text{P}$  States”, *Physics Journal Club*, March, **2003**.
18. “Research & Career Opportunities in Photonics”, *Physics Seminar*, November, **1999**.
19. “Precision Spectroscopy using Optical Modulators”, *Physics Club Talk*, February, **1997**.
20. “Precision Spectroscopy using Optical Modulators”, *Physics & Astronomy Seminar*, April **1996**.
21. “Computation of Fluorescent Intensity using Density Matrix Formalism”, *Atomic Physics Seminar*, March **1993**.
22. “Laser Cooling”, *Physics & Astronomy Seminar*, November, **1990**.
23. “Laser Cooling”, *Physics Club Talk*, November, **1990**.
24. “Optical Fibers”, *Physics Club Talk*, January, **1990**.
25. “Quantum Beat Spectroscopy”, *Physics Club Talk*, January, **1989**.

## EXTERNAL KEYNOTE & INVITED LECTURES

1. “Methane and Climate Change”, *New Zealand Climate Science Forum*, Virtual Presentation, October **2021**.
2. “Methane and Climate Change”, *Irish Climate Science Forum*, Virtual Presentation, November, **2020**.
3. “Methane and Climate”, Princeton Spectral Workshop, Princeton University, Princeton, NJ, June **2020**.
4. “Infrared Radiative Forcings of Greenhouse Gases”, *Department of Earth Science, Princeton University*, Princeton, NJ, December, **2019**.
5. “Quantifying Low Greenhouse Gas Influence of Agricultural Emissions”, *Irish Climate Science Forum*, Dublin, Ireland, **2018**.
6. “Inhomogeneities of Australian Temperature Measurements and Effect on Trend Determination”, *4<sup>th</sup> Santa Fe Climate Conference*, Santa Fe, NM, February, **2017**.
7. “Determination of Nuclear Charge Radii using Atomic Laser Spectroscopic Measurements”, *International Atomic and Nuclear Physics Meeting*, Atlanta, November, **2016**.
8. “Fun with Ultracold Atoms”, *Plenary Lecture for VIII Workshop on Atomic and Molecular Physics*, Jurata, Poland, September, **2015**.
- 9-10 “Is Global Warming Hot Air?”, Physics & Chemistry Department, Trent University, (February) and Physics Department, University of New Brunswick (January), **2015**.
11. “Precision Laser spectroscopy of Neutral Li and Li<sup>+</sup>”, Physics Department University of New Brunswick, January, **2015**.
12. “Precision Measurements with Ultracold Atoms”, *Aerospace Corp. U.S. Air Force Base*, Los Angeles, January **2015**.
13. “Precision Laser Spectroscopy of Lithium”, *Plenary Lecture for VII Workshop on Atomic and Molecular Physics*, Jurata, Poland, September, **2012**.
14. “Fun with Ultracold Atoms”, *Physics Department, University of Alberta*, November, **2008**.
15. “Precision Laser Spectroscopy of Lithium”, *Physics Department, Free University of Amsterdam*, September, **2008**.
16. “Examination of Climate Trends in Canada”, *Chemistry Department, Wilfrid Laurier University*, March, **2008**.
17. “Precise Measurement of the Rb D2 Natural Linewidth”, *Ultracold Matter Workshop of the Canadian Institute for Advanced Research*, Banff, Alberta, April, **2008**.
18. “Bose Einstein Condensation”, *Physics Department, Trent University*, Nov., **2007**.
19. “Bose Einstein in Magnetic, Optical and Microtraps”, *Physics Department, University of Waterloo*, May, **2007**.
20. “Precision Laser Spectroscopy of Lithium”, *Physics Department, University of Guelph*, September, **2006**.
21. “Nanoscience in Atomic, Molecular and Optical Physics”, *Nanoscience Working Group of International Union of Pure and Applied Physics, Biological Research Institute*, Szeged, Hungary, September, **2006**.
22. “Bose Einstein Condensation”, *Institute for Microstructural Sciences, National Research Council*, Ottawa, December, **2005**.

23. "Report of Nanoscience Working Group", *General Assembly of International Union of Pure & Applied Physicists*, Cape Town, South Africa, October, **2005**.
24. "Bose Einstein Condensation at York University: a) Quic Trap (Past), b) FORT (Present) c) Microtraps (Future)", *Workshop on Ultracold Matter, Canadian Institute for Advanced Research*, Toronto, Ontario, October, **2005**.
25. "Advances in Atomic, Molecular and Optical Physics", *Nanoscience Working Group of International Union of Pure and Applied Physics*, École Normale Superieure, Paris, April, **2005**.
26. "Technological Applications of Cold Atoms", *Hitachi Research Visit to University of Toronto*, April, **2004**.
27. "Effect of Instrumentation and Procedure Changes on Relative Humidity Measurements in Canada", *Climate Homogenization Workshop*, Toronto, April, **2004**.
28. "Examination of Hourly Relative Humidity Data in Canada during 1953-2003", *Climate Research Branch of Environment Canada*, Toronto, October, **2003**.
29. "Precision Spectroscopy in Li I & II", *Steacie Institute of National Research Council*, Ottawa, December, **2002**.
- 30-31 "Precision Measurements of Isotopes Shifts, Fine and Hyperfine Structure in Li I & II and Proposed Studies of Radioactive Li Isotopes", *TRIUMF and University of Alberta*, May, **2002**.
- 32-33 "Precision Measurements of Isotope Shifts, Fine and Hyperfine Structure in Li I & II", *Argonne National Laboratory and University of Windsor*, February, **2002**.
34. "Laser Manipulation of Microscopic Particles", *Brockhouse Institute for Materials Research*, McMaster University, **2001**.
35. "Determination of Relative Oscillator Strengths using Electromagnetic Induced Transparency", *Symposium in Honour of W. Happer*, Princeton University, N.J., August, **2001**.
36. "Intellectual Property", *2<sup>nd</sup> Annual Meeting Canadian Institute for Photonic Innovations*, Toronto, Ontario, May, **2001**.
37. "Photonics: Revolutionizing our Daily Lives", *Royal Canadian Institute*, Toronto, Ontario, January, **2001**.
38. "Laser Cooling and Atom Trapping", Seminar, *University of Alberta*, Edmonton, Alberta, July, **2000**.
- 39-53 "Research & Career Opportunities in Photonics" Fall, **1999**. This was given at: *Memorial University, Université de Moncton/Mt. Allison University, University of New Brunswick(Fredericton & St. John), University of Prince Edward Island, St. Francis Xavier University, University of Windsor, University of Western Ontario, University of Manitoba, University of Regina, University of Calgary, University of Saskatchewan, University of Alberta, Trent University*.
54. "Precision Spectroscopy at York University", Physics Seminar, *University of Wisconsin*, Madison, Wisconsin, USA, August, **1999**.
55. "Precision Measurements of Polarizabilities", Physics Seminar, *Utrecht Universiteit*, Netherlands, August, **1998**.
- 56-58 "Photonics Network Centre of Excellence", *Photonics Research Ontario Workshop*, Nortel Network, Inst. Microstructural Sciences, Feb. – March, **1998**.

- 59-64 “Precision Spectroscopy using Optical Modulators”, Fall, **1997**. This was given at: *TRIUMF, University of Alberta, University of Manitoba, St. Francis Xavier University, Mt. Allison University and University of New Brunswick*.
65. “Precision spectroscopy using Acousto-Optic Modulators”, *Physics Seminar, Institute for National Measurement Standards of National Research Council*, Ottawa, February, **1995**.
66. “Precision Spectroscopy using Acousto-Optic Modulators”, Physics Seminar, *University of Wisconsin*, Madison, USA, February **1995**.
- 67-72 “The Inverse Hook Method for Measuring Oscillator Strengths”, Summer **1988**. This was given at: *Duke University*, Durham, N.C., *University of Toronto*, *University of Waterloo*, *University of Illinois*, Chicago, Ill., *University of Western Ontario* and *York University*.
73. “Polarization of Noble Gas Nuclei”, Atomic Physics Seminar, *Yale University*, February **1988**.
- 74-78 “The Inverse Hook Method for Measuring Oscillator Strengths”, Spring - Summer **1987**. This was given at: *National Bureau of Standards*, Gaithersburg, Md., *Centre d’Études Nucleaires de Saclay*, Saclay, France, *University of Washington*, Seattle, Wash., *Bell Labs*, Holmdel, N.J. and *Yale University*, New Haven, Conn.
79. “The Inverse Hook Method for Measuring Oscillator Strengths”, *Physics Seminar, University of Windsor*, Windsor, June **1986**.
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## LIST OF PUBLICATIONS

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1. W. a. van Wijngaarden & W. Happer, **2022**, “2n-Stream Conservative Scattering”, *Atmospheric and Oceanic Physics* arXiv: 2207.03978.
2. W. A. van Wijngaarden & W. Happer, **2022**, “2n-Stream Radiative Transfer”, *Atmospheric and Oceanic Physics* arXiv: 2205.09713.
3. W. A. van Wijngaarden & W. Happer, **2022**, “Infrared Forcing by Greenhouse Gases”, CO<sub>2</sub> Coalition.
4. W. A. van Wijngaarden & W. Happer, **2021**, “Relative Potency of Greenhouse Gases”, *Atmospheric and Oceanic Physics* arXiv: 2103.16465.
5. W. A. van Wijngaarden & W. Happer, **2020**, “Dependence of Earth’s Thermal Radiation on Five Most Abundant Greenhouse Gases”, *Atmospheric and Oceanic Physics* arXiv: 2006.03098.
6. W. A. van Wijngaarden, B. Jian & A. Mouraviev, **2016**, “Manipulation of Ultracold Atoms using Double-Loop Microtraps”, *Phys. Scripta*, **91**, 054001.
7. W. A. van Wijngaarden & A. Mouraviev, **2016**, “Seasonal and Annual Trends of Australian Minimum/Maximum Daily Temperatures”, *The Open Atmospheric Science Journal*, **10**, 39-55.
8. W. A. van Wijngaarden & A. Syed, **2016**, “Changes in Annual Precipitation over the Earth’s Land mass excluding Antarctica from the 18<sup>th</sup> century to 2013”, *J. Hydrology* **531**, 1020-1027.
9. B. Jian & W. A. van Wijngaarden, **2015**, “A Linear Array of 11 Double-Loop Microtraps for Trapping Ultracold Atoms”, *J. Phys. B*, **47**, 215301.
10. W. A. van Wijngaarden, **2015**, “Arctic Temperature Trends from the early 19th Century to the present”, *Theoretical and Applied Climatology* **122** Iss. 3, 567-580 doi 10.1007/s00704-014-1311-z.
11. W. A. van Wijngaarden, **2015**, “Temperature Trends in the Canadian Arctic during 1895-2014”, *Theoretical and Applied Climatology*, **120**, Iss. 3, 609-615 doi.org/10.1007/s00704-014-1202-3.
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13. W. A. van Wijngaarden, **2013**, “Examination of Archival Data for Inhomogeneities and Determination of Climate Change in North America”, *Journal of Earth Science and Engineering*, **3**, 776-783.
14. W. A. van Wijngaarden & B. Jian, **2013**, “Advances in Laser Spectroscopy of Lithium”, *European Physical Journal D*, **222**, 2057-2066.
15. B. Jian & W. A. van Wijngaarden, **2013**, “A double-loop microtrap for ultracold atoms”, *Journal Optical Society of America B* **30**, No. 2, 238-243.
16. W. A. van Wijngaarden, **2012**, “Examination of Diurnal Temperature Range at stations in Continental U.S. during Sept. 8-17, 2001”, *Theoretical and Applied Climatology*, **109**, Issue 1, 1-5.
17. V. Isaac & W. A. van Wijngaarden, **2012**, “Surface Water Vapor Pressure and Temperature Trends in North America during 1948-2010”, *J. Climate* **25**, No. 10, 3599-3609.

18. G. A. Noble & W. A. van Wijngaarden, **2009**, “Critical Examination of Isotope Shift and Fine Structure Measurements for Optical Transitions in  $^{6,7}\text{Li}$ ” (**Invited**), *Canadian Journal of Physics*, **87**, 807-815.
19. B. Schultz, H. Ming, G. Noble & W. A. van Wijngaarden, **2008**, “Study of the Rb D2 Transition Linewidth at Ultralow Temperatures”, *European Physical Journal D* **48**, 171-176.
20. E. Chemali, B. Schultz & W. A. van Wijngaarden, **2008**, “Construction of a Surface Magneto-Optical Trap”, *Canadian Undergraduate Physics Journal*, Toronto, ON
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29. W. A. van Wijngaarden, **2005**, “Bose Einstein Condensation and Quantum Information: A Second Century of Einstein?”, (**Invited**), *Canadian Journal of Physics* **83**, 671-685.
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31. W. A. van Wijngaarden, **2005**, “Examination of Trends in Hourly Surface Pressure in Canada during 1953 – 2003”, *International Journal of Climatology* **25**, 2041-2049.
32. W. A. van Wijngaarden & B. Lu, **2004**, “Bose Einstein Condensates of Dilute Alkali Vapours: A Coherent Ensemble of Atoms”, (**Invited**), *Physics in Canada* **60**, No. 5.
33. B. Lu & W. A. van Wijngaarden, **2004**, “Bose Einstein Condensation in a QUIC Trap”, *Canadian Journal of Physics* **82**, 81-102.
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35. H. D. Osthoff, W. Jaeger, J. Walls & W. A. van Wijngaarden, **2004**, “An axial molecular beam diode Laser Spectrometer”, *Review of Scientific Instruments*, **75**, 46-53.



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52. W. A. van Wijngaarden, **1997**, “Scalar and Tensor Polarizabilities of Low Lying S, P, D, F and G States in Rubidium”, *Journal of Quantitative Spectroscopy & Radiative Transfer* **57**, No. 2, 275-279.

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59. W. A. van Wijngaarden & J. Li, **1994**, "Measurement of Isotope Shifts and Hyperfine Splittings of Ytterbium using Acousto-Optic Modulation", *Journal of Optical Society of America B* **11**, No. 11, 2163-2166.
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  80. W. A. van Wijngaarden & A. Syed, **2016**, “Changes in Global Precipitation from the 18<sup>th</sup> Century to 2013”, *Proceedings of American Meteorological Society Meeting*, New Orleans.
  81. W. A. van Wijngaarden, **2015**, “Arctic Temperature Trends from the early 19<sup>th</sup> Century to the present” *Proceedings of American Meteorological Society Meeting*, Phoenix.
  82. W. A. van Wijngaarden, **2013**, “Surface Water Vapor & Temperature Trends in North America during 1948-2010”, *Proceedings of 3<sup>rd</sup> International Workshop on Climate Informatics*, Boulder, Colorado.
  83. W. A. van Wijngaarden, **2013**, “Examination of Archival Data for Inhomogeneities and Determination of Climate Change in North America”. *Proceedings of 1<sup>st</sup> International Workshop on Econometric Applications in Climatology*.
  84. W. A. van Wijngaarden, **2012**, “Water Vapor Pressure and Temperature Trends in North American During 1948-2010”, *Proceedings of American Meteorological Society Meeting*, New Orleans, La.
  85. W. A. van Wijngaarden, **2010**, “Examination of Archival Canadian Wind Data for Inhomogeneities during 1953-2005”, *Proceedings of American Meteorological Society Meeting*, Atlanta, Ga.
  86. W. A. van Wijngaarden & B. Schultz, **2009**, “Precision Spectroscopy with Ultracold Atoms”, **(Invited)** *Proceedings of 5<sup>th</sup> International Symposium on Modern Problems of Laser Physics*, Editors: S. N. Bagayev & P. V. Pokassov.

**PUBLICATIONS IN REFEREED  
CONFERENCE PROCEEDINGS**

87. W. A. van Wijngaarden, **2008**, “Examination of Canadian Climate immediately after Sept. 11, 2001”, *Proceedings of American Meteorological Society Meeting*, New Orleans, La.
88. L. A. Vincent & W. A. van Wijngaarden, **2006**, “Surface humidity and temperature trends in Canada for 1953-2004”, *Proceedings of American Meteorological Society Meeting*, Atlanta, Ga.
89. W. A. van Wijngaarden, **2006**, “Estimation of Precipitation in Canada using Archival Data of Relative Humidity, Temperature and Precipitation Data”, *Proceedings of American Meteorological Society Meeting*, Atlanta, Ga.
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95. W. A. van Wijngaarden & W. Happer, **2022**, “Effect of H<sub>2</sub>O Continuum on Radiative Forcing”, *From Spectroscopy to Climate: Radiative Constraints on the General Circulation*, Princeton, N.J.
96. W. A. van Wijngaarden & W. Happer, **2022**, “Effect of Scattering on Radiative Transfer”, CFMIP Meeting on Clouds, Precipitation, Circulation and Climate Sensitivity, Seattle, WA.
97. W. A. van Wijngaarden & W. Happer, **2022**, “Effect of H<sub>2</sub>O Continuum on Radiative Forcing”, *CFMIP Meeting on Clouds, Precipitation, Circulation and Climate Sensitivity*, Seattle, WA.
98. W. A. van Wijngaarden & W. Happer, **2021**, “Radiative Forcing of CF<sub>4</sub> and SF<sub>6</sub>”, *Virtual CFMIP Meeting on Clouds, Precipitation, Circulation and Climate Sensitivity*.
99. W. A. van Wijngaarden & W. Happer, **2020**, “Comparison of Calculated & Observed Top of Atmosphere Infrared Intensities”, *Virtual CFMIP Meeting on Clouds, Precipitation, Circulation and Climate Sensitivity*.
100. W. A. van Wijngaarden & W. Happer, **2019**, “Effect of Clouds on Observed and Modeled Top of the Atmosphere Radiative Intensities”, *Fall Meeting of the American Geophysical Union*, San Francisco, CA.

## CONFERENCE PRESENTATIONS

93. A. Gambhir & W. A. van Wijngaarden, **2022**, “Monte Carlo Calculation of Cloud Layer Reflectance for Isotropic, Rayleigh & Forward Scattering”, *Canadian Undergraduate Physics Conference*, Guelph, ON.
94. W. A. van Wijngaarden & W. Happer, **2022**, “2n-Stream Radiative Transfer”, *From Spectroscopy to Climate: Radiative Constraints on the General Circulation*, Princeton, N.J.
101. W. A. van Wijngaarden & W. Happer, **2019**, “Comparison of Observed and Modeled Top of the Atmosphere Intensities”, *CFMIP Meeting on Clouds, Precipitation, Circulation and Climate Sensitivity*, Mykonos, Greece.
102. W. A. van Wijngaarden & W. Happer, **2019**, “Relative Infrared Radiative Forcings of Greenhouse Gases”, *Gordon Research Conference on Radiation and Climate*, Bates College, Lewiston, ME.

103. W. A. van Wijngaarden & W. Happer, **2019**, “Potency of Greenhouse Molecules”, *American Meteorological Society Meeting*, Phoenix, AZ.
104. W. A. van Wijngaarden & W. Happer, **2018**, “Impact of Linewidth Narrowing on Climate Sensitivity”, *European Geophysical Union General Assembly*, Vienna, Austria.
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106. W. A. van Wijngaarden & A. Mouraviev, **2017**, “Seasonal and Annual Trends of Australian Minimum/Maximum Daily Temperature during 1856-2014”, *American Meteorological Society Meeting*, Seattle, WA.
107. W. A. van Wijngaarden, B. Jian & A. Mouraviev, **2016**, “Manipulation of Ultracold Atoms using Double-Loop Microtraps”, *Meeting of the Division of Atomic, Molecular & Optical Physics of the APS*, Providence, Rhode Island.
108. W. A. van Wijngaarden & A. Syed, **2016**, “Changes in Global Precipitation from 1850 to the Present”, *American Meteorological Society Meeting*, New Orleans, LA.
109. A. Mouraviev & W. A. van Wijngaarden, **2015**, “Modelling Magnetic Fields of Microtrap Arrays”, *Canadian Undergraduate Physics Congress*, Trent, ON.
110. A. Syed & W. A. van Wijngaarden, **2015**, “Changes in Global Precipitation from 1850 to the Present”, *Canadian Association of Physics Congress*, Edmonton, AB.
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113. A. Syed & W. A. van Wijngaarden, **2015**, “Changes in Global Precipitation from the 17<sup>th</sup> Century to 2013”, *2<sup>nd</sup> Econometric Applications in Climatology Workshop*, Guelph, ON.
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115. W. A. van Wijngaarden, H. Yang & B. Jian, **2014**. “Precision Measurement of Lithium Hyperfine and Fine Structure Intervals”, *International Conference on Atomic Physics*, Washington D.C.
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119. B. Jian & W. A. van Wijngaarden, **2014**, “Double-Loop Microtrap Array for Ultracold Atoms”, *International Conference of Quantum Optics*, Obergurgl, Austria.
120. W. A. van Wijngaarden, **2013**, “Surface Water Vapor & Temperature Trends in North America during 1948-2010”, *3<sup>rd</sup> International*

- Workshop on Climate Informatics*, Boulder, Colorado.
121. B. Jian & W. A. van Wijngaarden, **2013**, “Double-loop Microtrap for Ultracold Atoms”, *Meeting of the Division of Atomic, Molecular & Optical Physics of the APS*, Quebec, City, Quebec.
  122. W. A. van Wijngaarden, J. Wang & B. Jian, **2013**, “Precision Spectroscopy of Lithium”, *Meeting of the Division of Atomic, Molecular & Optical Physics of the APS*, Quebec, City, Quebec.
  123. W. A. van Wijngaarden, **2013**, “Examination of Archival Data for Inhomogeneities and Determination of Climate Change in North America”, *1<sup>st</sup> International Workshop on Econometric Applications in Climatology*, Guelph, ON.
  124. B. Jian & W. A. van Wijngaarden, **2013**, “Double-loop Microtrap for Ultracold Atoms”, *Canadian Association of Physics Congress*, Montreal, Quebec.
  125. W. A. van Wijngaarden, J. Wang & B. Jian, **2013**, “Precision Spectroscopy of Lithium”, *Canadian Association of Physics Congress*, Montreal, Quebec.
  126. W. A. van Wijngaarden, **2012**, “North American Temperature & Water Vapor Trends during 1984-2010”, *Canadian Meteorological & Oceanographic Society*, Montreal, Quebec.
  127. B. Jian & W. A. van Wijngaarden, **2012**, “Loading an Atom Chip”, *Ultra Cold Matter Workshop of Can. Institute for Advanced Research (CIFAR)*, Banff, Alta.
  128. B. Jian & W. A. van Wijngaarden, **2011**, “Loading a Far Off Resonance Trap from a  $^{87}\text{Rb}$  MOT”, *Meeting of the Division of Atomic, Molecular & Optical Physics of the APS*, Atlanta, Ga.
  129. B. Jian, P. Zhao, B. Schultz & W. A. van Wijngaarden, **2010**, “Trapping Rubidium Atoms using a High Power Infrared Laser”, *Canadian Association of Physics Congress*, Toronto, ON.
  130. E. Chemali, B. Jian & W. A. van Wijngaarden, **2010**, “Precision Laser Spectroscopy using Lithium”, *Canadian Association of Physics Congress*, Toronto, ON. (*Winner of Best AMO Poster*)
  131. V. Isaac & W. A. van Wijngaarden, **2010**, “Climate Change in Canada during the Last Half Century: Trends in Temperature, Absolute & Relative Humidity”, *Canadian Association of Physics Congress*, Toronto, ON.
  132. W. A. van Wijngaarden, **2010**, “Examination of Archival Canadian Wind Data for Inhomogeneities during 1953-2005”, *American Meteorological Society Meeting*, Atlanta, Ga.
  133. B. Schultz, A. Sibilia & W. A. van Wijngaarden, **2009**, “Experiments with Ultracold Atoms”, *Ultra Cold Matter Workshop of the Canadian Institute for Advanced Research (CIFAR)*, Halifax, N.S.
  134. B. Schultz, G. Noble & W. A. van Wijngaarden, **2009**, “Precision Spectroscopy with Ultracold Atoms”, *Canadian Association of Physics Congress*, Moncton, N.B.
  135. W. A. van Wijngaarden, **2009**, “Critical Examination of Isotope Shift and Fine Structure Measurements for Transitions in  $^{6,7}\text{Li}$ ”, (**Invited**) , *Canadian Association of Physics Congress*, Moncton, N.B.
  136. B. Schultz, G. Noble & W. A. van Wijngaarden, **2008**, “Precision Spectroscopy with Ultracold Atoms”, (**Invited**) *Modern Problems in Laser Physics*, Novosibirsk, Russia.
  137. G. Noble & W. A. van Wijngaarden, **2008**, “Precision Laser Spectroscopy of Isotope Shifts, Fine & Hyperfine Structure in  $\text{Li}^+$  and

- Neutral Lithium”, *Modern Problems in Laser Physics*, Novosibirsk, Russia.
138. E. Chemali, B. Schultz & W. A. van Wijngaarden, **2008**, “Construction of a Surface Magneto-Optical Trap”, *Canadian Undergraduate Physics Conference*, Toronto, ON.
139. B. Schultz, G. Noble & W. A. van Wijngaarden, **2008**, “Precise Lifetime Determination from Measurement of Natural Transition Linewidth”, *International Conference on Precision Physics of Simple Atomic Systems*, Windsor, ON.
140. G. Noble & W. A. van Wijngaarden, **2008**, “Precision Laser Spectroscopy of Isotope Shifts, Fine & Hyperfine Structure in  $\text{Li}^+$  and Neutral Lithium”, *International Conference on Precision Physics of Simple Atomic Systems*, Windsor, ON.
141. B. Schultz, G. Noble, H. Ming & W. A. van Wijngaarden, **2008**, “Precision Measurement of the Rb D2 Natural Linewidth at Ultralow Temperature”, *Meeting of the Division of Atomic, Molecular & Optical Physics of the APS*, Philadelphia, Pa.
142. B. Schultz & W. A. van Wijngaarden, **2008**, “Measurement of the Rb D2 Natural Linewidth”, *Ultra Cold Matter Workshop of the Canadian Institute for Advanced Research*, Banff, Alberta.
143. B. Schultz, G. Noble & W. A. van Wijngaarden, **2008**, “Bose Einstein Condensation at York University”, *Ultra Cold Matter Workshop of the Canadian Institute for Advanced Research*, Banff, Alberta.
144. B. Schultz & W. A. van Wijngaarden, **2008**, “Bose Einstein Condensation at York University”, *Ultracold NanoMatter*, Toronto, ON.
145. B. Schultz, H. Ming & W. A. van Wijngaarden, **2008**, “Measurement of the Rb D2 Natural Linewidth”, *Ultracold NanoMatter*, Toronto, ON.
146. W. A. van Wijngaarden, **2008**, “Examination of Canadian Climate immediately after Sept. 11, 2001”, *American Meteorological Society Meeting*, New Orleans, La.
147. G. Noble & W. A. van Wijngaarden, **2007**, “Precision Laser Spectroscopy of Li D Lines and Determination of Relative  $^{6,7}\text{Li}$  Nuclear Size”, *Cross Border Workshop*, Toronto, ON
148. B. Schultz & W. A. van Wijngaarden, **2007**, “Determination of Rb 5P Radiative Lifetime from Measurement of Natural Linewidth of D2 line using Ultracold Atoms”, *Cross Border Workshop*, Toronto, ON
149. H. Ming, B. Schultz, G. Noble & W. A. van Wijngaarden, **2007**, “Bose Einstein Condensation at York University”, *Cross Border Workshop*, Toronto, ON
150. H. Ming & W. A. van Wijngaarden, **2007**, “Transfer of Ultracold  $^{87}\text{Rb}$  from a QUIC Magnetic Trap into a Far Off Resonance Optical Trap”, *Meeting of Division of Atomic, Molecular & Optical Physics of APS*, Calgary.
151. G. Noble & W. A. van Wijngaarden, **2007**, “Precision Measurement of the 2P  $^{6,7}\text{Li}$  Fine Structure Intervals and Isotope Shift and Determination of Relative  $^{6,7}\text{Li}$  Nuclear Size”, *Meeting of the Division of Atomic, Molecular & Optical Physics of the APS*, Calgary, Alta.
152. B. Schultz & W. A. van Wijngaarden, **2007**, “Linewidth Measurement of Rubidium D2 Line using Ultracold Atoms”, *Ultra Cold Matter Workshop of the Canadian Institute for Advanced Research*, Vancouver, B.C.
153. H. Ming, B. Schultz, G. Noble & W. A. van Wijngaarden, **2007**, “Transfer of Ultracold Rubidium Atoms from a Magnetic Trap into a Far Off Resonance Optical Trap”, *Ultra Cold Matter Workshop of the Canadian Institute for Advanced Research*, Vancouver, B.C.

154. H. Ming, B. Schultz & W. A. van Wijngaarden, **2006**, “Bose Einstein Condensation in a Variety of Traps”, *Canadian Association of Physics Congress*, St. Catherines, ON
155. G. Noble, B. Schultz & W. A. van Wijngaarden, **2006**, “Precision Measurement of the  $2P$   $^{6,7}\text{Li}$  Isotope Shift and Fine Structure Intervals”, *Canadian Association of Physics Congress*, St. Catherines, ON.
156. W. A. van Wijngaarden, **2006**, “Precipitation Estimation in Canada using Archival Climate Data”, *Canadian Association of Physics Congress*, St. Catharines, ON
157. H. Ming, B. Schultz, G. Noble & W. A. van Wijngaarden, **2006**, “Bose Einstein Condensation in an Optical Trap”, *Ultra Cold Matter Workshop of the Canadian Institute for Advanced Research*, Banff, Alta.
158. L. A. Vincent & W. A. van Wijngaarden, **2006**, “Surface humidity and temperature trends in Canada for 1953-2004”, *American Meteorological Society Meeting*, Atlanta, Ga.
159. W. A. van Wijngaarden, **2006**, “Estimation of Precipitation in Canada using Archival Data of Relative Humidity, Temperature and Precipitation Data”, *American Meteorological Society Meeting*, Atlanta, Ga.
160. H. Ming & W. A. van Wijngaarden, **2005**, “Bose Einstein Condensation at York University”, *Cold Atom Workshop of the Canadian Institute for Advanced Research*, Toronto, ON
161. M. Lukomski, J. MacAskill, D. Seccombe, C. McGrath, S. Sutton, J. Teuwin, W. Kedzierski, R. Reddish, J. W. McConkey, W. A. van Wijngaarden & I. Bray, **2005**, “MOT Measurements of Electron Impact Cross Sections in Cesium”, *Canadian Association of Physics Congress*, Vancouver, B.C.
162. B. Lu, I. Corlett, H. Ming & W. A. van Wijngaarden, **2005**, “Applications of Bose Einstein Condensates”, *Banff Cold Atom Meeting*, Banff, Alta.
163. W. A. van Wijngaarden & G. Noble, **2005**, “Precision Spectroscopy of Li I & II”, **(Invited)**, *ICONO/LAT Conference*, St. Petersburg, Russia.
164. W. A. van Wijngaarden, **2005**, “Surface Pressure Trends in the Canadian Arctic during 1953-2003”, *American Meteorological Society Meeting*, San Diego, CA.
165. M. Lukomski, J. A. MacAskill, D. P. Seccombe, C. McGrath, S. Sutton, J. Teuwin, W. Kedzierski, T. J. Reddish, J. W. McConkey, W. A. van Wijngaarden and I. Bray, **2005**, *International Conference on Positrons, Electrons and Atomic Collisions*, Rosario, Argentina.
166. L. A. Vincent & W. A. van Wijngaarden, **2005**, “Changes in Hourly Surface Relative Humidity Measurements and Instruments in Canada during 1953-2003”, *American Meteorological Society Meeting*, San Diego, CA.
167. B. Lu, J. Yang & W. A. van Wijngaarden, **2004**, “Bose Einstein Condensation in a QUIC Trap”, *International Conference on Atomic Physics*, Rio de Janeiro, Brazil.
168. W. A. van Wijngaarden & G. Noble, **2004**, “Precision Spectroscopy of Li I & II”, **(Invited)**, *Hydrogen Atom III*, Rio de Janeiro, Brazil.
169. B. Lu & W. A. van Wijngaarden, **2004**, “Bose Einstein Condensation”, *Ultracold Atom Workshop*, Shanghai, China.
170. W. A. van Wijngaarden, **2004**, “Bose Einstein Condensation” **(Invited)**, *Workshop on Ultracold Atoms*, Banff, Alta.
171. W. A. van Wijngaarden, **2004**, “Bose Einstein Condensation in a QUIC Trap” **(Invited)**,



- Canadian Association of Physics Congress*,  
Winnipeg, Man.
172. T. Reddish, J. MacAskill, C. McGrath, D. Secombe, M. Lukomski, J. Teeuwen, S. Sutton, W. Kedzierski, J. W. McConkey, W. A. van Wijngaarden & I. Bray, **2004**, “Progress Report on the Measurement of Cesium Electron Impact Cross Sections Using a Magneto-Optical Trap”, *Canadian Association of Physicists Congress*, Winnipeg, Man.
173. W. A. van Wijngaarden & L. A. Vincent, **2004**, “Trends in Relative Humidity in Canada from 1953-2003”, *Canadian Association of Physics Congress*, Winnipeg, Man.
174. W. A. van Wijngaarden & L. A. Vincent, **2004**, “Changes in Relative Humidity in Canada during 1953-2003”, *Canadian Meteorological and Oceanographic Society Meeting*, Edmonton, Alta.
175. W. A. van Wijngaarden & L. A. Vincent, **2004**, “Trends in Relative Humidity in Canada during 1953-2003”, *American Meteorological Society Meeting*, Seattle, Washington.
176. J. A. MacAskill, C. McGrath, W. Kedzierski, J. W. McConkey, W. A. van Wijngaarden & I. Bray, **2003**, “Ground and Excited State Cross Sections for Electron Impact on Cesium”, *International Conference on Positrons, Electrons and Atomic Collisions*, Stockholm, Sweden.
177. J. J. Clarke & W. A. van Wijngaarden, **2003**, “Measurement of the Fine and Hyperfine Structure of the  ${}^{6,7}\text{Li}^+ 1s2s {}^3\text{S}$  and  $1s2p {}^3\text{P}$  States”, *International Conference on Positrons, Electrons and Atomic Collisions*, Stockholm, Sweden.
178. H. D. Osthoff, J. Walls, W. A. van Wijngaarden & W. Jaeger, **2003**, “An Axial Molecular Beam Mid-Infrared Tunable Diode Laser Spectrometer”, *4<sup>th</sup> International Conference on Tunable diode Lasers*, Zermatt, Switzerland.
179. B. Lu & W. A. van Wijngaarden, **2003**, “Ultracold Laser Cooled Rubidium”, *Canadian Association of Physicists Congress*, Charlottetown, PEI.
180. R. Ashby, J. J. Clarke & W. A. van Wijngaarden, **2003**, “Precision Fine Structure and Stark Shift Measurement of Lithium 3D State”, *Canadian Association of Physicists Congress*, Charlottetown, PEI.
181. J. J. Clarke & W. A. van Wijngaarden, **2002**, “Measurement of the Fine and Hyperfine Structure of the  ${}^{6,7}\text{Li}^+ 1s2s {}^3\text{S}$  and  $1s2p {}^3\text{P}$  States”, *International Conference on Atomic Physics*, Boston, Mass.
182. R. Ashby, J. Walls, J. J. Clarke, B. Lu & W. A. van Wijngaarden, **2002**, “Precision Spectroscopy of Lithium D Lines”, *International Conference on Atomic Physics*, Boston, Mass.
183. J. J. Clarke & W. van Wijngaarden, **2002**, “Precision Frequency Measurement in  $\text{Li}^+$  using an Electro-optically Modulated Laser Beam”, *DAMOP Meeting of APS*, Williamsburg, Va.
184. W. A. van Wijngaarden, R. Ashby, J. Walls, J. J. Clarke & B. Lu, **2002**, “Measurement of Isotope Shifts, Fine & Hyperfine Splittings of Li D Lines”, *DAMOP Meeting of APS*, Williamsburg, Va.
185. H. D. Osthoff, W. Jaeger, J. Walls and W. A. van Wijngaarden, **2002**, “Axial Molecular Beam Diode Laser Spectrometer for Atmospheric Monitoring and the Study of Weakly Bound Complexes”, *Remote Sensing and Space Technology: Diode Laser and Applications*, Seattle, Washington.
186. J. J. Clarke & W. A. van Wijngaarden, **2002**, “Fine and Hyperfine Structure Splittings of the  ${}^{6,7}\text{Li}^+ 1s2s {}^3\text{S}$  and  $1s2p {}^3\text{P}$  States”, *4<sup>th</sup> Annual Cross Border Workshop*, University of Rochester, NY.

187. J. J. Clarke & W. A. van Wijngaarden, **2002**, “Precision Frequency Measurement in  $\text{Li}^+$  using an Electro-optically Modulated Laser Beam, *Canadian Association of Physicists Congress*, Quebec City.
188. W. A. van Wijngaarden, R. Ashby, J. Walls, J. J. Clarke & B. Lu, **2002**, “Isotope Shifts, Fine & Hyperfine Splittings of Li D Lines”, *Canadian Association of Physicists Congress*, Quebec City.
189. J. J. Clarke & W. A. van Wijngaarden, **2002**, “High Precision Test of using Electro-Optic Modulators”, *OPTO Canada*, Ottawa, ON
190. J. J. Clarke, H. Chen & W. A. van Wijngaarden, **2001**, “EIT and Optical Switching in a Cascade System”, *Optical Society of America Meeting*, Long Beach, Calif.
191. J. Walls, J. J. Clarke & W. A. van Wijngaarden, **2001**, “Measurement of Li Isotope Shift, Hyperfine and Fine Structure Splittings”, *Division of Atomic, Molecular & Optical Physics Meeting of APS*, London.
192. J. J. Clarke, H. Chen & W. A. van Wijngaarden, **2001**, “EIT and Optical Switching in a Rubidium Cascade System”, *SPIE meeting*, Rochester, NY.
193. H. Chen, J. J. Clarke & W. A. van Wijngaarden, **2001**, “Electromagnetically Induced Transparency in Laser Cooled Cesium”, *Division of Atomic Molecular & Optical Physics Meeting of APS*, London, ON
194. J. J. Clarke, S. Cauchi & W. A. van Wijngaarden, **2001**, “Spectroscopy of  $\text{Li}^+$  using an Electro-optically Modulated Laser Beam”, *Division of Atomic Molecular & Optical Physics of APS*, London, ON
195. W. A. van Wijngaarden, **2001**, “History of Lasers” (**Invited**), *Canadian Mathematics Society*, Toronto, Ontario.
196. H. Osthoff, W. Jaeger, J. Walls & W. A. van Wijngaarden, **2001**, “High Resolution Spectra of  $\text{H}_2\text{CO}_2$  and  $\text{D}_2\text{-CO}_2$  van der Waals Complexes measured with an Axial Molecular Beam Infrared diode Laser Spectrometer”, *Waterloo Chemistry Meeting*, Waterloo, ON
197. W. A. van Wijngaarden, **2001**, “Laser Cooling & Trapping and Electromagnetically Induced Transparency” (**Invited**), *Canadian Association of Physicists Congress*, Victoria, B.C.
198. J. Walls, J. J. Clarke & W. A. van Wijngaarden, **2001**, “Measurement of Lithium Hyperfine Splitting and Isotope Shift”, *Canadian Association of Physicists Congress*, Victoria, B.C.
199. J. J. Clarke, S. Cauchi & W. A. van Wijngaarden, **2001**, “Spectroscopy of  $\text{Li}^+$  using an Electro-optically Modulated Laser Beam”, *Canadian Association of Physicists Congress*, Victoria, B.C.
200. W. A. van Wijngaarden, **2001**, “Intellectual Property”, *Annual Meeting Canadian Institute for Photonic Innovations*, Toronto, ON.
201. H. Osthoff, W. Jaeger, J. Walls & W. A. van Wijngaarden, **2001**, “A Laser Based Gas Sensor for Environmental Monitoring”, *Annual Meeting Canadian Institute for Photonic Innovations*, Toronto, ON.
202. J. Walls, J. J. Clarke & W. A. van Wijngaarden, **2001**, “Measurement of Frequency Intervals with a Nonlinear Laser Frequency Scan”, *Annual Meeting Canadian Institute for Photonic Innovations*, Toronto, ON.
203. J. J. Clarke, H. Chen & W. A. van Wijngaarden, **2001**, “Electromagnetically Induced Transparency and Optical Switching”, *Annual Meeting Canadian Institute for Photonic Innovations*, Toronto, ON.

204. J. J. Clarke, H. Chen & W. A. van Wijngaarden, **2000**, “Electromagnetically Induced Transparency and Optical Switching in a Rubidium Cascade System”, *Optocontact NE*, Rochester, NY.
205. W. A. van Wijngaarden, J. J. Clarke & J. Walls, **2000**, “Precise Measurement of Rb Stark Shifts using an Electro-Optically Modulated Laser Beam”, *International Quantum Electronics Conf.*, Nice, France.
206. J. Walls, J. J. Clarke, S. Cauchi, G. Karkas, H. Chen & W. A. van Wijngaarden, **2000**, “Precise Stark Shift measurements in Rubidium using an Electro-optically Modulated Laser Beam”, *Annual Meeting Canadian Institute for Photonic Innovations*, Quebec City, Quebec.
207. N. Davis, A. Johnson, J. J. Clarke, H. Chen & W. A. van Wijngaarden, **2000**, “Progress towards a slow atomic beam using a cesium magneto-optical trap”, *Annual Meeting Canadian Institute for Photonic Innovations*, Quebec City, Quebec.
208. Y. Xu, P. Arboleda, W. Jaeger, J. R. Walls & W. A. van Wijngaarden, **2000**, “Monitoring of Pollutants using a Diode Laser Spectrometer”, *Annual Meeting Canadian Institute for Photonic Innovations*, Quebec City, Quebec.
209. N. Davis, H. Chen & W. A. van Wijngaarden, **2000**, “Cesium magneto-optical Trap”, *Canadian Association of Physicists Congress*, Toronto, ON.
210. J. Walls, J. J. Clarke & W. A. van Wijngaarden, **2000**, “Precise Stark Shift Measurements in Rubidium Using an Electro-optically Modulated Laser”, *Canadian Association of Physicists Congress*, Toronto, ON.
211. W. A. van Wijngaarden, J. J. Clarke & N. Davis, **1999**, “Translation of Cold Atoms in a MOT by an Electric Field”, *Optical Society of America Meeting*, Santa Clara, Calif.
212. N. Davis, J. J. Clarke & W. A. van Wijngaarden, **1999**, “Laser Cooling and Trapping of Cesium Atoms”, *Canadian Association of Physicists Congress*, Fredericton, N. B.
213. N. Davis, J. J. Clarke & W. A. van Wijngaarden, **1999**, “Laser Cooling and Atom Trapping of Cesium”, *Photonics Research Ontario Workshop*, Alliston, ON.
214. J. Xia, J. J. Clarke, J. Li & W. A. van Wijngaarden, **1999**, “Precise Determination of the Scalar and Tensor Polarizabilities of the Cesium (10-13)D<sub>3/2,5/2</sub> States”, *Photonics Research Ontario Workshop*, Alliston, ON.
215. J. J. Clarke & W. A. van Wijngaarden, **1998**, “Measurement of Hyperfine Splittings of Li<sup>+</sup> Transition”, *16<sup>th</sup> International Conference on Atomic Physics*, Windsor, ON.
216. W. A. van Wijngaarden, **1998**, “Precision Measurements of Atomic Polarizabilities” (**Invited**), *16<sup>th</sup> International Conference on Atomic Physics*, Windsor, ON.
217. W. A. van Wijngaarden & J. Xia, **1998**, “Lifetimes and Polarizabilities of Low Lying S, P and D Francium States”, *Meeting of the Division of Atomic, Molecular & Optical Physics of APS*, Santa Fe, N. M.
218. J. J. Clarke & W. A. van Wijngaarden, **1998**, “A Quadrupole Magnetic Trap using a Static Electric Field to Study Ultracold Atoms”, *Meeting of Division of Atomic, Molecular & Optical Physics of APS*, Santa Fe, N. M.
219. J. Xia, J. J. Clarke, J. Li & W. A. van Wijngaarden, **1998**, “Precise Determination of the Scalar and Tensor Polarizabilities of the Cesium (10-13)D<sub>3/2,5/2</sub> States”, *Meeting of Division of Atomic, Molecular & Optical Physics of APS*, Santa Fe, N. M.
220. W. A. van Wijngaarden & J. Xia, **1998**, “Lifetimes and Polarizabilities of Low Lying S,

- P and D Francium States”, *Canadian Association of Physicists Congress*, Waterloo, ON.
221. J. J. Clarke & W. A. van Wijngaarden, **1998**, “A Quadrupole Magnetic Trap using a Static Electric Field to Study Ultracold Atoms”, *Canadian Association of Physicists Congress*, Waterloo, ON.
222. J. J. Clarke & W. A. van Wijngaarden, **1998**, “Measurements of Hyperfine Structure in  $\text{Li}^+$  using Optical Modulators”, *Photonics Research Ontario Workshop*, Alliston, ON.
223. W. A. van Wijngaarden & J. Li, **1997**, “Precise Stark Shift Measurements in Cesium using an Electro-Optically Modulated Laser Beam”, *Meeting of Division of Atomic, Molecular & Optical Physics of APS*, Wash. D.C.
224. J. Xia, J. Li & W. A. van Wijngaarden, **1997**, “Isotope Shifts of the  $^1\text{S}_0 - ^3\text{P}_1$  Transition in Ytterbium”, *Meeting of Division of Atomic, Molecular & Optical Physics of APS*, Wash. D.C.
225. W. A. van Wijngaarden & J. Xia, **1997**, “Lifetimes and Polarizabilities of Low Lying S, P and D Francium States”, *Meeting of Divisions of Optics & Photonics and Atomic & Molecular Physics of Canadian Association of Physicists Congress*, Ottawa, ON.
226. J. J. Clarke & W. A. van Wijngaarden, **1997**, “Suppression of Majorana Transitions in a Magnetic Quadrupole Trap using a Static Electric Field”, *Meeting of Divisions of Optics & Photonics and Atomic & Molecular Physics of Canadian Association of Physicists Congress*, Ottawa, ON.
227. J. Xia, J. J. Clarke, J. Li & W. A. van Wijngaarden, **1997**, “Precise Determination of the Scalar and Tensor Polarizabilities of the Cesium  $(10-13)\text{D}_{3/2,5/2}$  States”, *Meeting of Divisions of Optics & Photonics and Atomic & Molecular Physics of Canadian Association of Physicists Congress*, Ottawa, ON.
228. B. Seyed-Mahmoud, K. Aldridge, G. A. Henderson & W. A. van Wijngaarden, **1997**, “Elliptical Instability in the Earth’s Outer Core”, *Meeting of Canadian Geophysical Union*, Banff, Alta.
229. W. A. van Wijngaarden, **1997**, “Precision Spectroscopy using Electro/Acousto-Optic Modulators” (**Invited**), *Canadian Association of Physicists Congress*, Calgary, Alta.
230. J. Xia, J. Li & W. A. van Wijngaarden, **1997**, “Precision Measurements of Excited State Polarizabilities in Cesium”, *Canadian Association of Physicists Congress*, Calgary, Alta.
231. B. Seyed-Mahmoud, K. D. Aldridge, G. A. Henderson & W. A. van Wijngaarden, **1996**, “The Study of Elliptical Instability in the Earth’s Outer Core”, *American Geophysical Union*, San Francisco, Calif.
232. W. A. van Wijngaarden, **1996**, “Precision Laser Spectroscopy using Acousto/Electro-Optic Modulators”, *Optical Society of America Meeting*, Rochester, N. Y.
233. K. D. Aldridge, B. Seyed-Mahmoud & W. A. van Wijngaarden, **1996**, “Elliptic Instability and the Earth’s Core”, *Study of the Earth’s Deep Interior*, Brisbane, Australia.
234. W. A. van Wijngaarden & J. Li, **1996**, “Precision Stark Shift Measurement of the Calcium  $(4s)^2 ^1\text{S}_0 - (4s4p) ^3\text{P}_1$  Transition”, *Canadian Association of Physicists Congress*, Ottawa, ON.
235. W. A. van Wijngaarden & J. Li, **1995**, “Precision Spectroscopy using Frequency Modulated Lasers”, *11<sup>th</sup> Interdisciplinary Laser Science Conference*, Portland, Ore.
236. W. A. van Wijngaarden, **1995**, “Use of Acousto-Optic Modulators for Precision Laser Spectroscopy” (**Invited**), *Meeting of Division*

- of Atomic, Molecular & Optical Physics of APS, Toronto, ON.
237. J. Li & W. A. van Wijngaarden, **1995**, “Stark Shift of the  $(6s)^2\ ^1S_0 - (6s6p)\ ^3P_1$  Ytterbium Transition”, *Meeting of Division of Atomic, Molecular & Optical Physics of APS*, Toronto, ON.
238. J. Li & W. A. van Wijngaarden, **1995**, “Stark Shift of the  $(6s)^2\ ^1S_0 - (6s6p)\ ^1P_1$  Barium Transition”, *Conference on Lasers & Electro-Optics & Quantum Electronics*, Baltimore, Md.
239. J. Li & W. A. van Wijngaarden, **1995**, “Precision Measurements of Stark Shifts, Hyperfine Splittings and Isotope Shifts in Barium and Ytterbium”, *Canadian Association of Physicists Congress*, Laval, Que.
240. W. A. van Wijngaarden & J. Li, **1994**, “Precision Measurement of Stark Shifts in Barium and Ytterbium”, *European Conference on Lasers & Electro-Optics & Quantum Electronics*, Amsterdam, Netherlands.
241. W. A. van Wijngaarden & J. Li, **1994**, “Precision Measurement of Transition Linewidths”, *12<sup>th</sup> International Conference on Spectral Lineshapes*, Toronto, ON.
242. J. Li & W. A. van Wijngaarden, **1994**, “Hyperfine Structure and Isotope Shifts of Barium and Ytterbium”, *Meeting of Division of Atomic, Molecular & Optical Physics of APS*, Charlottesville, Va.
243. W. A. van Wijngaarden & J. Li, **1994**, “Use of Acousto-Optic Modulators for Precision Spectroscopy”, *Canadian Association of Physicists Congress*, Regina, Sask.
244. W. A. van Wijngaarden, E. A. Hessels, N. E. Rothery, J. Li & E. M. Anklesaria, **1993**, “Measurements of the Stark Shifts of  $6P_{3/2} - nS_{1/2}$   $n=10-13$  Cesium Transitions”, *Optical Society of America Meeting*, Toronto, ON.
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