

Collected Works of

Archie Hamielec

**Dedicated to Dr. *Archie Hamielec* on
the occasion of his 70th birthday**

Prepared by

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Hamilton, ON, Canada**

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Contents

Volume I

Photographs of Archie Hamielec, Archie and Mae Hamielec

Biographical Note

Selected Remembrances from Former Ph.D. Students

Curriculum Vitae of Archie Hamielec

List of Archie Hamielec's Former Graduate Students

List of Archie Hamielec's Refereed Journal Papers

Collected Works from 1958 to 1982

Volume II

Photographs of Archie Hamielec, Archie and Mae Hamielec

Biographical Note

List of Archie Hamielec's Refereed Journal Papers

Collected Works from 1983 to 1992

Volume III

Photographs of Archie Hamielec, Archie and Mae Hamielec

Biographical Note

List of Archie Hamielec's Refereed Journal Papers

Collected Works from 1993 to 2004



Archie Hamielec at 70



Archie and Mae Hamielec on GTS Millennium cruise

Biographical Note:

As Archie always says, life is timing. His family caught the last boat that left Poland for Canada in the spring of 1939 just before the war started. Archie was only four years old. The family settled in Cabbage Town where they bought a shoe store. His mother was a very strong Roman Catholic and wanted Archie to be a bishop. Realizing he had little chance to become Pope, Archie chose not to follow her advice. In his high school years, he did two important things, one very good and one not so good. The good thing was that he dated a beautiful young lady named Mae. The other was that he bought a Ford Monarch and became the first family member to own a car. While the car brought convenience to the family and to himself for dating Mae, he spent all his summer job money fixing the old taxi car!

Archie entered the University of Toronto in 1953 and graduated with a Bachelor of Chemical Engineering in 1957. Many important things happened during those years that had a tremendous influence on his life. In 1955 he married his high school sweetheart. Mae owned a grocery business at the time. Archie listened to Bill Graydon's advice not to buy penny shares but blue chips. With Mae's encouragement and strong support, Archie continued graduate studies in U of T's Chemical Engineering. He received his Master's degree in 1958 and Ph.D. in 1961 under the supervision of Ab Johnson. After U of T, Archie spent three years in CIL McMasterville outside Montreal, Quebec. There he met Malcolm Baird and they wrote a few papers together. It was an easy time with a booming economy. However, with a doctoral degree, Archie felt like a trophy up on the wall at CIL and was seeking more of a challenge. So it was that in September 1963, Archie joined McMaster as an Assistant Professor in Chemical Engineering. At that time the department, which had started in the late 50's, consisted of Ab Johnson, Cam Crowe and Terry Hoffman. Don Woods followed in December 1963.

Archie was trained in the area of fluid mechanics and was recruited by McMaster to teach Transport Phenomena. His early research was about bubbles, drops and particles. Collaborating with Hans Pruppacher at UCLA, Archie published a series of papers about falling rain drops. Those works are still being cited after half a century. Today, Archie is best known as one of the founding fathers in Polymer Reaction Engineering. How did he become a polymer man? There were three reasons: First, CIL had a polyethylene plant in Edmonton. Archie met Alf Rudin who was the group leader of PE research at McMasterville. Archie thought his colleague's life was much easier: push the polymer through a hole, cut it, weigh it, and publish a paper. He realized later this was a misconception, but by that time it was too late. Second, Archie was a little tired of fluid mechanics after U of T, CIL, and a couple of years at McMaster. He needed something new and realized he would be the first chemical engineer in Canada working on polymers. He liked to study reactor engineering and believed the reactor must have some effect on polymer properties. He recruited John Duerksen as his first Ph.D. student working on polymers. Archie bought a gel permeation chromatograph in 1964 and became the first professor in the world who owned GPC equipment. His first polymer paper with John Duerksen appeared in AIChE J 1967. Third, Archie's dedication to polymer research was said to be strengthened by Mike Nichols' *The Graduate* (1967). In Archie's opinion, Mr. McGuire's one-word career advice to Ben Braddock was absolutely wise: *Plastics*.

Archie has great affection for research. He has published over 300 refereed journal papers. Many of his works have become classics in the field. Archie is a generalist rather than a specialist. He believes that a good professor should change research areas every five to ten years. He worked in many different areas from synthesis and characterization, to kinetics and reactor engineering, to modeling, to applications. His papers have appeared in various journals that made assembling this collection a daunting task. While not as passionate for undergraduate teaching, Archie really enjoyed giving more financially rewarding industrial short courses. Many R&D people in almost all the major polymer companies worldwide have attended his courses, or had a copy of his course notes.

Archie was particularly interested in collaborating with industry. In 1982, together with Terry Hoffman and John MacGregor, Archie founded the McMaster Institute for Polymer Production Technology (MIPPT) and became the founding director. The Institute attracted a large number of industrial projects and collected considerable funds to expand polymer research from chemical engineering to other departments at McMaster. Archie's reputation in industry also brought him numerous consulting opportunities and made him a rich professor. Archie took an early retirement from undergraduate teaching in 1993. He became interested in legal work as an expert witness. In one case, he was challenged by a lawyer about his expertise in adhesives because he had never mentioned the word in his papers. Archie replied that Einstein never wrote an article on how to make an atomic bomb but was well known as the father of the bomb.

Archie received much recognition for his superstar research performance. He was promoted to Associate Professor in 1967 and Full Professor in 1970. Archie received CSCHE's ERCO Award in 1974, CIC Protection Coatings Award in 1978, NSERC Industrial Chair in Polymer Production Technology in 1986, CIC-Dunlop Award in Macromolecular Science and Engineering in 1987, R.S. Jane Award in 1994, Honorary Doctoral Degree from the University of Waterloo in 1998. He was elected as a Fellow of Royal Society of Canada (FRSC) in 1987. However, in Archie's opinion, his highest award was the well being of his former graduate students. Over 40 years, he supervised and co-supervised 35 Ph.D., 40 Masters, and numerous postdoctoral fellows. Fifteen Ph.D. students have become professors and developed strong polymer research programs in their respective universities. Archie's impact can be best attested if one attends the North American and European Polymer Reaction Engineering conferences. In a typical scenario, one third of the speakers and attendees are closely related to Archie, most of them are his former graduate students working in universities and polymer industries. In 1997, Alex Penlidis organized a special issue of *Industrial and Engineering Chemistry Research* dedicated to Archie's retirement. Over 40 papers were contributed from all over the world.

Archie is not only a star scientist but also a superb business man. His business mind impressed all of us. Every week day, he turned on the radio in his office at 12 noon sharp for the business report. No matter what you were discussing with him, you would have to yield to the report. His vision helped Nalco get into the baby diaper business and helped SC Johnson develop an emulsion polymerization process. He was awarded one loonie for the latter invention. Archie's other hobby is politics. In his view, science is simple but people are complicated, and the most complicated people are politicians. In 1969, he spent his sabbatical year in Moscow. He studied Russian communism more than polymers during that year. In 1985, he visited China and compared Chinese communism to Russia's. He accurately predicted the outcomes of the two

systems. Recently, he made a few more predictions: In the next twenty years, Canada will become richer from oil and tar sand, China will become an economic power, and chemical engineering as a discipline will always experience waves (these may not always be turbulent) with the next uptake being biotech. We will check the accuracy of these predictions with him in 2025!

Archie believes the three most important things in one's life are: health, wealth, and family. Archie and Mae have been happily married for fifty years. They have raised three daughters. Cindy Hamielec is a well known medical doctor in Hamilton and is also the President of the Critical Care Foundation of Canada. Lisa Hamielec, trained as a chemical engineer, now owns an Executive Relocation company in Calgary. Tia Hamielec, trained as a chemist, owns several Tim Horton's in Calgary.

On the occasion of his 70th birthday, we think it's an appropriate time to honour Archie by preparing this three-volume *Collected Works of Archie Hamielec*. As his colleagues, we congratulate him and thank him for his tremendous contributions to the department. We have received a lot of responses from Archie's former graduate students. All have fond memories of him. We selected some remembrances, which are included in this book. All of us wish Archie Happy 70th Birthday (Archie's birthday is Jan. 10), wish Mae Happy 70th Birthday (Mae's birthday is Oct. 28), and wish Archie and Mae Happy 50th Wedding Anniversary.

In preparing this book, we received lots of assistance from many people. We thank each and every one of them. In particular, we thank Aileen Wang who collected most of the papers, Kathelyn Smith who communicated with Archie's former graduate students, Doug Keller, Lynn Falkiner and Kathy Goodram who provided the valuable material and information about Archie. We also thank Alex Penlidis and Hidetaka Tobita for finding some of the missing papers. Finally, we thank the department for the financial support.

Andy Hrymak
Bob Pelton
Shiping Zhu

Remembrances



Paul A. Charpentier, Ph.D. 1997.

First of all, Happy 70th Birthday! I can't really express how much of a good experience I had during my PhD days, as it was simply excellent. You were a fantastic supervisor and I learned so much, about so many things. I liked your casual focused attitude from the first time I met you and the way you taught me to continually improve myself. I always loved the phone calls on Sunday night when you would come back from consulting with new ideas. I've been busy with my own students in the past several years, and I know that some of your expertise shines through. It was my true privilege to work for and know you, and thanks so much for all of your hard work promoting me.



Paul Gloor, Ph.D. 1993.

Congratulations on your 70th Birthday! Archie, you played a huge role in my career and personal development. I will always be appreciative of your support and guidance. You hired me as an engineer in MIPPT and provided me with several very interesting industrial consulting opportunities. I was even able to travel to Brasil for several weeks. It was your encouragement and support that convinced me to pursue my PhD. You removed many of the obstacles to make this possible. Of course, I learned a great deal, and I mean more than just the technical developments. I learned how to conduct a research project and the value of collaboration with others both within academia and industry. It was within MIPPT that I gained my first supervisory experiences. You placed a great deal of confidence in me, and I grew because of it. These skills that have served me well over the years. More than all of that, I valued our friendship. Your warm and casual approach makes you an excellent mentor. Thank you. Happy Birthday.



Albert Hui, Ph.D. 1970.

Dr. Archie Hamielec was my M.Eng. thesis supervisor when I joined the Graduate School of Chemical Engineering in the fall of 1965 after graduated in Chemical Engineering from the University of N.S.W. (Sydney, Australia) in 1964. Dr. Archie Hamielec was the pioneer in Gel Permeation Chromatography (GPC) development for the measurement of molecular distribution of polymers at the time. He had the idea and foresight in the promotion and application of polymer science and has since made significant contributions towards industrial use and advancement towards polymer process and product development. Archie was a driven and kind supervisor of graduate students, a lovable family man. We maintained contacts after my graduation. Through our contact, he gave a teaching seminar for the Company (Nova Chemicals) a couple of years before his retirement from teaching undergraduates at McMaster University. Archie is a role model for us. I wish Archie and his family well. All the bests and many happy returns.



David Hunkeler, Ph.D. 1990.

I met Archie Hamielec as a Bachelors student interested in pursuing graduate studies, after hearing so much about his vision, as well as unique talents in identifying important research themes, long before they became fashionable. I appreciated, as I am sure many have, his dedication to being informed as to the scientific, technical and commercial sides of various issues, his vast data bank of knowledge, and his approach to guidance. I think few people have influenced me to the extent that Albin has and I have come to know my mentor as a friend, a gift for which I am very grateful. Difficult, as all genius are, to

characterize, I learned very much about the people-side of life from him and felt his continual availability, and ability to push us subtly, as a key part of my formation. He has been outstanding in all his endeavors, yet modest and kind. To me he embodies much of what is a Canadian, a scientist and an engineer. He has an audacity which, when mixed with a curiosity and vision, has been a guiding light for so many of us. I have had the pleasure to dine with him in my house, visit his, know his family, and see him in many different days, through both jubilant and difficult news, though always calm. I think there can be no one moment when I appreciated him more than any other, no single story that points a light at this special man, and rather, I would like to thank him for the great deal he has, and continues, to give me. Best wishes, Archie, on your 70th and your wonderful scientific accomplishments. Regards to Mae and your Daughters.



Alexander Penlidis, Ph.D. 1986.

In 1982 Archie told me the story that when he was a kid, every Sunday, he would avoid going to church with his mother by hiding into a large trunk. Everybody thought that he had already gone to church, while Archie was in the trunk snoozing. In April 1984 Archie showed up in my office on a Thursday and told me that I was going to a conference in Miami to present on his behalf the following Monday. Of course, I panicked...but all went well. After that incident, I established a network of spies, between Archie's office and my lab. A very sophisticated 'early warning system' would inform me within seconds that Archie had left his office and that he was moving towards the polymer labs. Having learned from his own childhood story, I would immediately leave my office and go into the pilot plant and hide behind some big reactors, consoles and large pieces of equipment. I don't think that Archie has ever caught another glimpse of me in the labs! Happy 70th birthday, Archie and Mae!



Shamel Shawki, Ph.D. 1978.

To me, professor Hamielec is much more than a great teacher and research director. I fondly remember how Mae and Archie almost adopted the overseas graduate students and made them feel at home. The first few weeks in a new country thousands of miles away from home can be quite difficult for many people. They were definitely hard on me. I will be forever grateful to Mae and Archie for all their efforts to make us feel welcome. Archie's commitment to his students did not end with their graduation either. I got my big break professionally when Archie recommended me for a great research position in a small, but rapidly growing, private chemical company in Mississauga. I am very thankful for that. Best wishes to Archie and Mae for many more years of health, wealth and happiness.



Joao B P Soares, Ph.D. 1994.

The first time I met Archie Hamielec I had just arrived from Brazil. When he asked me my name, I promptly announced, as most Brazilian would, my complete name "João Batista de Paiva Soares". Right then I had the first glimpse of Archie's fabulous ability to synthesize complexity in a concise, single concept. After a few seconds of hesitation, he asked me, "Is it OK if I call you Joah?" The nickname did stick (with a few variations around the same theme) and, as a consequence, I have spent much less time with introductions since then! Jokes aside, Archie has an extraordinary ability to see the essence of complex phenomena and to express them in the most economic way. He created in me a passion for elegant mathematical formulations of problems in science and engineering and a total abhorrence of complexity for complexity's sake. He was also responsible for forcing me to go to the laboratory and perform a few experiments because, after all, a polymerization reactor is more than a set of mathematical equations. For all of this, I cannot thank you enough, Archie. I have been very fortunate to spend many

hours with Archie Hamielec first as a mentor, and then as a colleague and a friend. You are a great inspiration for all of us.



Sydney Thomas, Ph.D. 1998.

I was fortunate to have two opportunities to experience and observe the genius that is Professor A.E. Hamielec particularly in the area of polymer reaction engineering. These two distinct times occurred when I began graduate work for my Ph.D and when I completed it. His breadth of knowledge and tremendous achievements in academia and industry are well known internationally. This is exemplified by the numerous publications and large number of graduate supervisions. I wish, however, to attest to the other side of Prof. Archie Hamielec. I refer to his generosity of spirit and dedication to family life. During the completion of my graduate work, Archie and his very supportive and charming wife, May, treated me as part of their family. To them as well as Tia and family I say a very special thanks on this the occasion of Archie's seventieth birthday. I recall a simple but very illuminating statement that Archie made to me. We were discussing the kinetic modeling of branched polymers and I must have alluded to the complexity of the system. He said " Sydney, I just enjoy doing this.' Congratulations on your seventieth birthday and I wish that you continue enjoying your work and especially your family life.



Hidetaka Tobita, Ph.D. 1990

My wife and I arrived in Toronto in the evening of Dec.26, 1986 to start studying under the guidance of Dr. Hamielec. I did not know his telephone number, and I dialed the directory assistance from our hotel room without knowing his address, finding that there was only one Hamielec in the Hamilton area! On the next day, Dr. Hamielec and Mae kindly picked us up and offered us to let Cindy's house until she would sell it in the coming spring. It was our wonderful experience to live in a much larger house than our Japanese's, with a big fat old cat, Angus. He likes to snooze on my lap, but unfortunately he sometimes failed to jump up, leaving deep scratches on my lap. I clearly remember our happy days over there. Our first son who was born in Hamilton is now 16. No wonder we are all getting older. Lots of big questions Dr. Hamielec gave me during my Ph.D. studies have been the source of my research topics down to this day. After coming back to Japan, I decided to take the liberty to consider Dr. Hamielec my second father. Happy 70th birthday, Dr. Hamielec! *From your incompetent son in Japan.*



Marco A. Villalobos, Ph.D. 1993.

If you look up the word "mentor" in a dictionary you will find something like: mentor(men-tor, n): A wise and trusted counselor or teacher. Archie Hamielec, no doubt, is a mentor. Archie Hamielec, before anyone else, comes to my mind whenever I hear this word. But Archie is a lot more than a great academic mentor. In fact Archie's most effective mentoring was not even related to specific research topics. It was related to leading his students to grow to their maximum potential regardless of our background and level of intellectual ability. When you see all of these pages in detail, his papers and unparallel achievements are absolutely impressive. But a little bit more hidden, when you look closer and see where all of his students are today, and what lives we lead, both personal and professional, it is when his mentoring hand takes his true colossal dimension. But don't get the impression that with all of his talents Archie is a stiff icon or an unflawed person. He is as human as the rest of us. In fact, the last time I got the pleasure to hear Archie lecture was in a conference in Florida in 1998. He had been given a portable microphone and spoke with it in one hand for the whole of 30 minutes ... talking to the wrong end of the equipment. I remember that I saw him and thought: Archie is worldwide recognized genius

but for the last 30 minutes he has talked through a battery case. Archie: many, many congratulations on your 70.



Eduardo Vivaldo-Lima, Ph.D. 1998.

When I applied for graduate studies (M.Eng.) at McMaster University, I had in mind some computational project (optimization or even CFD), not necessarily related to polymers. I had read the description of what all professors did in the chemical engineering department, in their graduate studies booklet. I was attracted to Archie Hamielec's research activities, but to be honest, the description of what he did looked quite complicated for me, so I was rather intimidated to follow that research path, and I did not include him as my first choice of supervisor in my application form. Since I had some polymer reaction engineering previous experience, I was accepted and assigned Professors Hamielec and Wood as supervisors. Now that I look back, I realize how important that not completely conscious choice was in my life. Since I was a masters student at Mac, what surprised me most of Archie Hamielec was that he showed the same respect and that he would pose the same type of intellectual challenges to everyone in his group, either coworkers, postdoctoral fellows, Ph.D. or M.Eng. students. Although I would not see him very often, one discussion session with him would be enough to keep me busy for a full school term, following all his recommendations and guidelines. Other aspect that has always impressed me about him, besides his top technical and scientific knowledge, was his vision and wisdom to foresee the performance and future of the polymer industry. I have not met too many people with that wisdom. Perhaps one of the most important contributions of Archie Hamielec, besides the many scientific publications, patents, technological innovations, etc., is the fact that he molded or influenced many individuals who are the key leaders of the polymer reaction engineering community of today, or highly respected researchers in other areas of polymer science and engineering. I am sure that all of us who were supervised by him consider a privilege being recognized as Hamielec's fellows.



Tuyu Xie, Ph.D. 1990.

Dr. Hamielec has a great personality. Before I came to Canada, I had studied some Dr. Hamielec's research work on free radical polymerizations. His fame and significant work in polymer reaction engineering brought me from China to McMaster University. I met Dr. Hamielec in summer 1985, just before his 50th birthday. He was very friendly, very frank, and very patient during our first conversation in his office. Dr. Hamielec was the first Professor that I talked with not using my mother tone language. I knew that I had difficulty to express myself clearly using a new language. But, he did not show any impatience in listening to me and instead ensured me that he understood me completely. He showed me my research program and two polymer reaction engineering courses that I shall take in September. He told me to feel free to see him whenever I want to. I did so in the following five years as his Ph.D. student. Dr. Hamielec is very generous. Dr. Hamielec arranged sufficient financial support to his students and prepared world-class research facilities and support resources to assist students to carry out research programs. Each year, Dr. Hamielec invited all his graduate students and faculty members to his home B.B.Q. night. The mature students would bring their children to the B.B.Q. party. We always had a good time consuming all kinds of food and messing up his home. Dr. Hamielec is a great teacher. Teaching is an art. Dr. Hamielec mastered the art well. He gave concise but comprehensive course note. He always gave a lecture with clear illustration of concepts. The contents of his seven level graduate course was changed yearly to include most current development in the polymer field. That indeed set a high standard for graduate education. I always enjoyed his lectures. Dr. Hamielec is a great scientist and an outstanding supervisor. The work included in this book is self-evidence as a great scientist. Dr. Hamielec was a great supervisor that every graduate student wishes to have. Whenever I encountered

problems in research program, he always treated it as priority to help to resolve it without delay. When I submitted a manuscript for review on Friday, he gave me back the reviewed manuscript with detailed comments on Monday. If I gave him a manuscript before his business trip, he would return the manuscript with his comments right after the trip. This alone showed his dedication to student's work. It was my choice to come to Dr. Hamielec's Institute to pursue my Ph.D. education. I received great training under supervision of Dr. Hamielec and it was five productive years of my research career.



Huining Xiao, Ph.D. 1994.

About 13 years ago when we had a party at Archie's home, he kept telling everyone how you could become rich quickly via buying and selling stocks and shares. I did not follow what Archie recommended until 10 years later. I did and tried very hard, but I lost more than half of my investment. This was only thing I followed his advice but turned out to be a mistake. Of course, I regretted that I should have tried 10 years ago. What I followed exactly more than 10 years ago was his precious and professional guidance. Without your encouragement and patience, I would not have had my academic achievements. I would like to express my sincere thanks to Archie, and really wish you enjoy your wonderful birthday. 70 isn't old! It is just like a bit older than 23, but three times the fun!



Shiping Zhu, Ph.D. 1991.

Happy 70th, Archie and Mae. Twenty years ago we met in Beijing and celebrated Mae's birthday at the Forbidden City Restaurant. It was indeed a very memorable party. Thank you for the wonderful food that I could not afford at that time. Thank Mae for showing me those stores that I was not allowed to walk in otherwise. The Beijing experience with Hamielecs really changed my career and life. It made me so determined to be a Hamielec follower. I arrived in Hamilton just before Christmas Eve, 85'. You invited me to your Christmas party and made me feel at home immediately. Over the past two decades, I have had so many memories with you. Put it succinct - I would not have this career and life today without your help throughout the years. I started from Masters and transferred to Ph.D. in 87. After more than 5 years, I received my Ph.D. degree. What timing! Our economy started a three-year recession in 91 and you generously offered me a postdoctoral position. I have never experienced an economic recession before. My first two years of postdoc progressed well. However, it was a real challenge when I got into the third year without knowing where the future was headed after a total of 8 years of struggling in Canada. It was you who encouraged me to keep pushing. You told me that sunny days would come after the rain. I learned from your experience working through the mills. You were absolutely correct. The skies finally brightened in 94 and I started as a faculty member – a dream that I have held for so long. You helped me establish myself in the field. Looking back on these twenty years, I am amazed at how fortunate I was to come to McMaster and to have Archie as supervisor. Having been a supervisor myself for ten years now, I have realized how talented Archie was at his job. You told me “science is simple, people are complicated.” You told me “life is timing.” You told me “the three most important things are health, wealth, and family”. You also told me so many other useful experiences and practical philosophies. After almost 10 years of being your student and postdoc and another 10 years of being your colleague, I feel I have only learned small part. I am fully convinced that there will never be another Archie Hamielec. The combination of your academic intelligence, business mind, and positive attitude toward life is absolutely incomparable. Maybe this is the beauty of a high standard role model – seeable but not reachable. Archie and Mae – I treasure your mentorship and friendship. Let's celebrate your birthdays again in another 20 years.

CURRICULUM VITAE

NAME: Alvin (Archie) Edward HAMIELEC

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Hamilton, Ontario L8S 4L7
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DEGREES: 1957 B.A.Sc., University of Toronto, Chemical Engineering
1958 M.A.Sc., University of Toronto, Chemical Engineering
1961 Ph.D., University of Toronto, Chemical Engineering

CURRENT STATUS: Professor of Chemical Engineering (tenured)*
Director, McMaster Institute of Polymer Production Technology
*Emeritus as of July 1, 1993

PROFESSIONAL ORGANIZATIONS:

- (i) Memberships in the following organizations:
CSChE., AIChE., ACS., APEO.
- (ii) Elected as Fellow of the Chemical Institute of Canada.
- (iii) Elected as Fellow of the Royal Society of Canada.

EMPLOYMENT HISTORY:

Academic:

1963 - 1967 Assistant Professor, Department of Chemical Engineering, McMaster University
1967 - 1970 Associate Professor, Department of Chemical Engineering, McMaster University
1970 - Date Professor*, Department of Chemical Engineering, McMaster University
*Emeritus as of July 1, 1993,
1983 - Date Founding Director, McMaster Institute for Polymer Production Technology

Industrial:

1961 - 1963 Research Engineer, Canadian Industries Ltd., McMasterville, Quebec
1968 - Date Consultant on polymer production technology: polymer reactors, polymer and polymer particle characterization

SCHOLARLY AND PROFESSIONAL ACTIVITIES:

1. Member of the editorial board of the Journal of Liquid Chromatography.
2. Member of the McMaster Science and Engineering Research Board.
3. Member of the Board of Directors of Front Wave, Inc.
4. Referee for all major journals in the field of polymer science and engineering.
5. External referee for the National Science Foundation (NSF), Petroleum Research Fund (PRF), and the Natural Sciences and Engineering Research Council (NSERC).

AREAS OF INTEREST:

1. Research: Polymer Production Technology (Design, optimization and control of polymer reactors and polymer characterization techniques)
2. Teaching: Polymer Production Technology (Principles of polymer reactor design and operation)

3. Consulting: Polymer Production Technology

HONOURS:

- 1974 ERCO Award of the Canadian Society of Chemical Engineering for research in polymer science and engineering.
1978 Chemical Institute of Canada Protection Coatings Award.
1986 Awarded the NSERC Industrial Research Chair in Polymer Production Technology.
1987 Selected as winner of the CIC-Dunlop Award in Macromolecular Science and Engineering for 1987.
1994 R.S. Jane Award - the premier award for excellence in chemical engineering in Canada - CSE

COURSES TAUGHT:

Chem. Eng.:	2C2	Information Management
	4A5	Transport Phenomena - Theory & Application
	4B3/6B3	Polymer Reaction Engineering
	4K4	Reactor Design
	4R4	Chemical Engineering Laboratory
	4W4	Chemical Plant Design and Simulation
	771	Polymer Reaction Engineering

SUPERVISORY:

Professor Hamielec has supervised (or co-supervised) 39 Ph.D. candidates. It is noteworthy that among the 39 Ph.D. candidates he supervised, 16 are now academics (Assistant, Associate and Full Professors of Chemical Engineering, Pharmacy and Meteorology). Many of these academics have developed research programs in polymer reaction engineering at their respective universities.

PROFESSIONAL DEVELOPMENT COURSES:

1. Organized and lectured at a professional development course, GEL PERMEATION CHROMATOGRAPHY, held at McMaster University, April 1967.
This course was attended by 75 analytical chemists and chemical engineers representing major polymer producing companies in North America.
2. Organized and lectured at a professional development course, POLYMER REACTORS AND MOLECULAR WEIGHT DISTRIBUTION, held at Niagara Falls, October 1967 and sponsored by the Canadian Society for Chemical Engineering.
This course was attended by 50 chemical engineers representing major polymer producing companies in North America.
3. Lectured at a professional development course, GEL PERMEATION CHROMATOGRAPHY, held at the University of Washington, April 1969.
This course was attended by 90 analytical chemists representing major polymer producing companies in North America.
4. Organized and lectured at a professional development course, POLYMER REACTOR ENGINEERING, held at Laval University, June 1972.
This course was attended by 75 chemical engineers representing major polymer producing companies in North America.
5. Organized and lectured at a professional development course, POLYMER REACTOR ENGINEERING, held in Mexico in 1973, 1977 and 1979.
The course was attended by chemical engineers and chemists representing major polymer manufacturing companies in Mexico.

6. Co-organized and lectured at a professional development course, A FLOCCULATION AND DISPERSION SHORT COURSE AND SYMPOSIUM, held in Toronto, November 1974.
This course was attended by 100 chemists and chemical engineers representing industry in North America.
7. Organized and lectured at an annual professional development course, POLYMER REACTION ENGINEERING, held at McMaster University, Hamilton, Canada, 1976 to present.
This course is attended by chemical engineers and chemists representing major manufacturing companies in North America and Europe.

INVITED LECTURES

1. Invited to spend 3 weeks in January 1971, as a visiting professor at Technion, Haifa and the Hebrew University, Jerusalem, Israel. While there he presented 4 lectures on Gel Permeation Chromatography, Polymerization Kinetics, Particle Dynamics and Transport Phenomena in Meteorology.
2. Invited to spend 3 months in the summer of 1972 as a visiting professor at the Atomic Energy Commission Research Establishment, Riso, Roskilde, and at the Technical University of Denmark, Lyngby, Denmark. The use of positron annihilation techniques (PAT) for the characterization of polymers was evaluated. In addition to acting as a research consultant he gave 7 lectures on gel permeation chromatography, polymerization kinetics and polymer reactor systems and on transport phenomena in combustion.
3. Invited to spend 3 months in 1977 as a visiting scientist at IBM Research Laboratories in San Jose, California. While there he worked with a GPC interfaced with a low angle laser light scattering photometer to characterize branched poly(vinyl acetate).
4. Invited to spend 6 months in 1978 as Visiting Anderson Professor at Lehigh University. While there he worked on the fundamentals of emulsion polymerization.
5. Invited to be plenary lecturer at the International Liquid Chromatography Symposium, in Strasbourg, France, in 1979.
6. Invited by Prof. Dr. K.H. Ebert to spend one month in 1980 as visiting professor in the Institute of Physical Chemistry, University of Heidelberg, where he has been co-supervising 2 Ph.D. candidates with Professor Ebert, since 1981.
7. Plenary lecturer speaking on Gel Permeation Chromatography at the International Symposium on Advances in Polymer Characterization, held at the University of Durham, U.K., in 1981.
8. Invited to lecture on "Recent Advances in Polymer Reaction Engineering", at the IUPAC Symposium in Bucharest, September 1983.
9. Invited to lecture on "Modelling Copolymerizations - Control of Composition, Chain Microstructure, Molecular Weight Distribution, Long Chain Branching and Crosslinking", at the International Symposium on Polymer Reaction Engineering, Berlin, October 1983.
10. Invited to lecture on "Dynamic Modelling of the Emulsion Copolymerization of Styrene/Butadiene" at the International Symposium on Emulsion Copolymerization, Lyon, March 1983.
11. Invited to lecture on "Recent Advances in the Characterization and Analysis of Polymers and Polymer Particles by Size Exclusion Chromatography" at POLYMER 85 - an International Symposium on Characterization and Analysis of Polymers, Melbourne, 1985.
12. Invited to lecture on "Polymer Reaction Engineering", International IUPAC Symposium on "Free Radical Polymerization", Genoa, Italy, May 1987.

13. Invited to lecture on "Polymer Reaction Engineering", International Basque Congress on "Polymer Materials", San Sebastian, Spain, September 1987.

Presented lectures at many universities and industrial laboratories on various topics related to the technology of polymer production.

PATENTS

Manufacture of Vinyl Ethers in a Continuous Manner. Canadian Patent No. 771, 680, November 1970.

Process for Continuous Bulk Copolymerization of Vinyl Monomers. U.S. Patent No. 4,414,370, November 1983. This patent covers a specialty polymer manufacturing process invented by Professor Hamielec. This process is presently being used commercially by S.C. Johnson & Son Inc., Racine, Wisconsin.

Retention Aids for Mechanical Pulps, U.K. Informal Patent Application (January 5, 1993), R. Pelton, A.E. Hamielec and H. Xiao.

BOOKS

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2. Hamielec, A.E. and MacGregor, J.F., Latex Reactor Principles: Design, Operation and Control, pp. 319-355 in "Emulsion Polymerization", Academic Press (1982).
3. Bassett, D.R. and Hamielec, A.E., "Emulsion Polymers and Emulsion Polymerization", ACS Symp. Series 165 (1981).
4. Hamielec, A.E., Correction for Axial Dispersion, pp. 117-160 in "Size Exclusion Liquid Chromatography of Polymers", Marcel Dekker, New York (1984).

List of Graduate Students (co)Supervised by Professor Archie Hamielec

DOCTORS OF PHILOSOPHY

LAST NAME	FISRT NAME	YEAR
ABDEL-ALIM	AHMED H.	1993
BALKE	STEPHAN T.	1972
BHATTACHARYA	DHRUBO	1985
CHARPENTIER	PAUL	1998
DUERKSEN	JOHN H.	1968
GARCIA-RUBIO	LUIS H.	1982
GLOOR	PAUL E.	1993
GUO	HUA	1996
HOUGHTON	WILLIAM T.	1966
HUI	ALBERT WAI TIN	1992
HUNKELER	DAVID J.	1990
ISHIGE	TOSHIYUKI	1972
KIM	CHERNG-JU	1984
KIPARISSIDES	CONSTANTINE	1979
KOLODKA	EDWARD	2003
KOURTI	THEODORA	1990
LECLAIR	BRIAN P.	1970
OMORODION	SUNNY N.E.	1976
PANG	KWOK-HING	1970
PENLIDIS	ALEXANDER	1986
POLLOCK	MARK J.	1984
SETO	PETER	1964
SHAWKI	SHAMEL M.	1974
SOARES	JOAO	1995
THOMAS	SYDNEY	1998
TOBITA	HIDETAKA	1990
TZOGANAKIS	CONSTANTINE	1988
VILLALOBOS	MARCO A.	1993
VIVALDO-LIMA	EDUARDO	1998
WOO	STEPHEN SUN-WAI	1972
WU	XIAOYU	1993
XIAO	HUINING	1995
XIE	TUYU	1991
YAU	ANTHONY YUK SEEN	1969
ZHU	SHIPING	1991

MASTERS OF APPLIED SCIENCE & MASTERS OF ENGINEERING

LAST NAME	FISRT NAME	YEAR
ANDERSON	JAMES HAROLD	1997
ARCHEMBAULT	RAYNALD	1966
BROADHEAD	TARAS O.	1984
CAMPBELL	JOHN D.	1985
COROYANNAKIS	PANAYOTIS	1978
DESOMER	PAUL M.F.I.	1973
EGAN	LOUISE A.	1986
GAZZOLA	LORI ANN	1990
GOOSNEY	DAVID D.	1973
GOSSEN	PAUL D.	1988
HAHN	KIRK F.	1992
HERNANDEZ-BARAJAS	JOSE	1990
HOFFMAN	ERIC J.	1984
HRUSKA	VLADO	1985
HUI	TAI KING A.	1967
HUSAIN	AAMIR	1976
JONES	KATHRYN M.	1986
KANETAKIS	JOHN	1984
KEUNG	CHUE-KWOK JOHN	1974
LE	DUY CAN	1968
LORD	MURRAY G.	1984
MIRAMONTES-VIDAL	LUIS	1976
MITCHELL	GARY B.	1986
PEARCE	STEPHEN L.	1967
RAY	STUART W.	1976
RICHMOND	JOHN	1975
SINGH	SURENDRA	1977
STANISLAWCZYK	VIC	1985
TEBBENS	KLAAS	1966
THOMPSON	MICHAEL	1994
URIBE	MARCO FIDEL	1976
VILLALOBOS	MARCO A.	1988
VIVALDO-LIMA	EDUARDO	1993
WALTHER	WILLIAM G.	1972
WEBB	STEVEN W.	1985
WONG	FRANK Y.C.	1984
WOO	KARL-KAR T.	1974
YABUKI	YASUAKI	1996
YARASKAVITCH	IRENE M.	1986
YAU	ANTHONY Y-S	1966

Volume I

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Volume II

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Volume III

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