Curriculum Vitae

NAWEED IMAM SYED

I. BIOGRAPHICAL DATA

Dr. Naweed I. Syed
142 Royal Terrace NW
Calgary, AB T3G 5J5

Citizenship: Canadian/Pakistani

Scientific Director, Alberta Children's Hospital Research Institute (ACHRI)
Professor, Department of Cell Biology & Anatomy
Cumming School of Medicine - University of Calgary
282 HMRB, 3330 Hospital Drive NW
Calgary, Alberta T2N 4N1 Canada
Tel: (403) 220-5479
E-mail: nisyed@ucalgary.ca

II. ACADEMIC RECORD

1988	**PhD,** Neurophysiology - Dept. Medical Physiology, University of Leeds, England, UK
1976 - 1980	BSc (Hons), Physiology -University of Karachi, Pakistan
1980 - 1982	MSc, Neuromuscular Physiology - University of Karachi, Pakistan.
1988 - 1991	Postdoctoral Research Fellow - Dept. Medical Physiology, University of Calgary, Canada.

III. AWARDS AND DISTINCTIONS

1985-1986	Tetley Lupton Scholarship (Leeds, UK)
1985-1988	Overseas Research Student Award (UK)
1986-1987	Dr. Wali Mohammed Award (UK)
1986-1988	University of Leeds Scholar (UK)
1991-1995	Parker B. Francis Fellow (USA)
1992-1997	Alberta Heritage Medical Research Scholar (Canada)
1993-1995	Alfred P. Sloan Fellow (USA)
1997-2002	Heritage Medical Senior Research Scholar (Canada)
1999-2000	International Fellow Abroad
2002-2007	Alberta Heritage Foundation for Medical Research (AHFMR) Scientist (Canada)
2002-2008	Canadian Institutes of Health Research (CIHR) Investigator (Canada)
2004	Calgary's Best Canadian Award - May 2004.
2004	Outstanding Scientist Award from the Asian Community in Toronto - May 2004.
2006	Fellow Royal College of Physicians (Edinburgh, UK)
2012	Canadian Sensation Award – South Asian Media Express Network, Feb 2012.
2012	Distinguished Achievement Award for Outstanding Contributions to Biomedical Research, Pakistan-Canada Association, March 2012.
2012	Distinguished Achievement Award, The Western Pakistani Association of Calgary
2012	Outstanding Collaboration Award, Schulich School of Engineering, Nov 2012.
2015	Canadians for Global Care Award of Recognition – April 2015.
2016	Building Healthy Relationships Award, Right to Live Foundation – February 2016.

2016 *Tamgha-i-Imtiaz* (Medal of Excellence – the highest civilian award for research and innovation) from the Pakistan Government – August 2016.
2017 Outstanding Citizen in the Community, House of Commons, Government of Canada (Chandra Arya – MP).
2017 Canada -150 Recognition Award, Pakistan-Canada Association
2017 Canada-150 Medal, Senate of Canada, Government of Canada
2017 Canada-150 Excellence Award, Canadians for Global Care Society
2017 Outstanding Community Service Award, Faculty Association, University of Calgary
2017 Recognition: Celebrating Canada: 150 Ideas and the Innovative Canadians who created them. Office of the Lieutenant Governor of Alberta.

https://www.lieutenantgovernor.ab.ca/cfcms/default/assets/File/Levee_150Ideas(1).pdf

2017 Canada Pakistan Business Council Excellence Award for innovation
2017 Award of Honor and Accomplishment, Sharif Academy (International, Canada Chapter)
2017 Appreciation Award, Zahra Academy, Karachi, Pakistan
2017 Appreciation Award, The Aga Khan University, Karachi, Pakistan
2017 Memento of Appreciation Award, Sir Syed University of Engineering and Technology, Karachi, Pakistan
2017 Distinguish Achievement Award, Shah Wilayt Trust, Karachi, Pakistan
2017 Appreciation Award, Kazmi Images, Toronto, Canada
2017 Innovation and Scientific Accomplishment Award,
2017 Award of Appreciation and Recognition, Markz-E-Ahlebayt, Toronto, Canada
2017 Award of Scholarly Achievements, Indo-Canadian Psychiatric Association
2017 Appreciation Award, Citizens for Citizens Society, Alberta, Canada
2018 Pride of Performance Award, Advanced Educational Institute and Research Center, Karachi
2018 Inspirational Award, MD International, Canada
2018 Mr. Edhi, Life Time Achievement Award, PCA Canada
2018 Peak Scholar, University of Calgary
2019 COPO (Canadians of Pakistani Origin) Award of Excellence
2019 Chief Guest for Education Award ceremony by Anjuman Sadaat-e-Amroha,
2019 Alberta Science and Technology (ASTech) Finalist, Outstanding Achievement in Technology
2019 Guest of Honor Award, The Citizen's Foundation of Canada
2019 Outstanding Innovation Award, Wilshire Laboratories
2019 Outstanding Research and Innovation Award, Boy Scouts Association of Pakistan.
2019 ALOHA: Empowering Young Minds Community Service Award
2019 Bay River Collage, Graduation Commencement Speech and Appreciation Award
2019 Pride of Nation Award, Lahore Chamber of Commerce and Industry,
2019 Honor of Inaugurating Research Unit at the Rawalpindi Medical University
2019 Guest Speaker, Rawalpindi Medical University, Pakistan
2019 Keynote Lecture, University of Health Sciences, Lahore, Pakistan
2019 Laid the Foundation Stone for future Pakistan International University, Islamabad, Pakistan
2019 Kotler Global Award Recipient, Toronto, Canada

IV. ACADEMIC APPOINTMENTS

2018 – present Chief Scientist, Creative Destruction Lab, University of Calgary
2018 – present Chair, Research and Innovation Council, MDI
2014 – 2019 Scientific Director, Alberta Children's Hospital Research Institute (ACHRI)
2012 – 2016 Director, Eyes High Postdoctoral Program – University of Calgary
2008 – 2012 Special Advisor to the VP (Research) on Biomedical Engineering

2008 – 2010	Research Director, Hotchkiss Brain Institute
2004 – 2014	Head, Department of Cell Biology & Anatomy - University of Calgary
2003 – present	Professor, Faculty of Medicine, Departments of Cell Biology & Anatomy/Physiology & Biophysics - University of Calgary
1999 – 2003	Associate Professor, Faculty of Medicine, Departments of Cell Biology & Anatomy/Physiology & Biophysics - University of Calgary
1991 – 1999	Assistant Professor, Faculty of Medicine, Departments of Cell Biology & Anatomy/Physiology & Biophysics - University of Calgary

V. EDUCATIONAL ACTIVITIES

Courses taught since 1991 to medical (MD), graduate (MSc, PhD and undergraduate (BSc and BHSc) students

Neuroanatomy
Developmental Neurobiology
(Taught at the University of Calgary and Free University, Amsterdam)
Neural control of rhythmic behaviors
The Physiological Development of the Fetus and Newborn (MDSC 751)
Neuroscience I – Systems Neurosciences
Neuroscience II – Cellular and Molecular Neuroscience
Neuroscience III – Developmental Neuroscience (MDSC619)
Advanced Respiratory Physiology
Cellular and Molecular Neuroscience - Friday Harbor, USA
Neuronal Basis of Rhythmogenesis (MDSC755)
Trophic Factors and Synapses (ZOOL528)
Human Physiology Courses (MDSC502 and MDSC404)
Behavioral Neurosciences (NEURO4630) - Lethbridge, AB
Organismal Biology (MDSC402-undergraduate)
Biomedical Engineering Anatomy (BMEN309)

1983-1984 Research and Teaching Assistant, Department of Physiology, University of Karachi, Pakistan. Teaching (Physiology) experience to both graduate and undergraduate students.

1985-1988 Teaching Assistant for first, second and final year medical, dental and physiology practical classes. I gave regular tutorials to first and second year physiology students. Supervised a final year (Neurophysiology) laboratory project.

i) UNDERGRADUATE (BSc and BHSc) LABORATORY PROJECTS SUPERVISED (full/half year credits)

1994	Mr. D. Faren	1995/96	Mr. H. Zaidi
1996	Ms. Z. Haque	1996/97	Ms. S. Aziz
1998	Mr. A. Leung	1998	Mr. T. Lee
1999	Mr. C. Leong	2000/01	Mr. M. Kazmi
2000	Ms. N. Van	2001/02	Ms. A. Umar
2001/02	Ms. B. Kazmi	2003	Ms. J. Tsui
2004	Ms. D. Mangat	2005	Ms. E. Budd
2005	Mr. J. Jun	2006	Ms. J. Leung
2006	Mr. C. Lu	2006	Mr. I. Poliakov
2007/08	Ms. M. Richard	2007/08	Ms. K. Shum
2008/09	Ms. S. Shivji	2008/09	Ms. A. Constantinescu

2009/10	Ms. A. Getz
2010/11	Mr. K. Thachek
2010/11	Ms. C. Fera
2011/13	Mr. M. Qureshi
2013/14	Ms. M. Flancia
2015/16	Ms. R. Durrani
2016/17	Mr. M. Sheikh
2017/21	Ms. S. Riaz
2019	Ms. J. Chow
2019	Mr. K. Haider
2019	Mr. T. Alhareesh
2019	Ms. J. Chow
2019	Mrs. Marcus Perhas
2009/10	Mr. C. Herman
2010/11	Mr. R. Wang
2010/11	Mr. R. Henning
2013/14	Ms. D. Urrego
2014/15	Mr. A. Qahtani
2016/17	Ms. S. Rothery
2017/21	Mr. F. Iqbal
2018/19	Ms. S. Atika
2019	Ms. E. Wildman
2019	Ms. B. Akhter
2019	Mr. F. Iqbal
2019	Mr. Jawwad Zaidi

Summer Students Supervised

1995-96	Mr. Alex Leung (AHFMR)
1996-98	Mr. Thomas Lee (AHFMR)
1998	Mr. Chris Leong (AHFMR)
1998	Mr. Farhan Zaidi
1999	Ms. Nosheen Zaidi
2002	Ms. Batool Kazmi (NSERC)
2003	Ms. Sharleen Chu(AHFMR)
2003-05	Mr. James Leung (AHFMR)
2004	Ms. Angie Cheng
2004	Mr. Sandeep Koshy (HYRS)
2005-07	Ms. Kelly Shum (BHSc/NSERC)
2005	Mr. Matthew Szarko (SCPP)
2006	Mr. Vishal Varshney (HYRS)
2007	Mr. James Jun (AHFMR)
2007	Ms. Maria Richard
2008	Ms. Holly Wobma (AHFMR)
2008	Ms. Noelle Wong
2008	Mr. Cameron Herman
2009	Ms. Noelle Wong (AHFMR)
2009	Ms. Angela Getz (BHSc)
2010	Ms. Noelle Wong (AIHS)
2010	Ms. Cassandra Fera (PURE)
2010	Mr. Robby Wang (OCSS)
2011	Ms. Noelle Wong (AIHS)
2012-14	Mr. Ryden Armstrong (AIHS)
2012	Mr. Cortt Piett
2012	Ms. Andrea Rakic
2015	Mr. Anish Arora (AIHS)
2016	Ms. Jenna Park (BHSc)
2016-17	Mr. Thomas Lijnses
2017	Mr. Fahad Iqbal
2017	Mr. Simon Wong
2018	Mr. Sean Hasan
2018-19	Ms. Urva Azeem
1995-96	Ms. Zara Haque (SEED)
1997	Mr. Fawaad Iqbal AHFMR)
1998-01	Mr. Mustafa Kazmi (AHFMR)
1998-01	Ms. Nina Van
2002	Ms. Alexandra Lys (HYRS)
2002	Mr. Chris Gerdung (HYRS)
2003	Ms. Simran Sandhu (AHFMR)
2004	Ms. Alexandra Lys (AHFMR)
2004	Mr. Sandeep Koshy (HYRS)
2005-07	Mr. Collin Luk (AHFMR)
2005	Ms. Jaspreet Khangaru (STEP)
2005-06	Mr. Joseph Andrews (HYRS/SCPP)
2006	Mr. Ilia Poliakov (NSERC)
2007	Mr. Adam Thomas (BHSc)
2007	Ms. Amy Leung (NSERC)
2008	Ms. Adina Constantinescu (NSERC)
2008	Mr. Arthur Lee
2008	Ms. Angela Getz
2009	Mr. Cameron Herman (BHSc)
2009	Ms. Adina Constantinescu (NSERC)
2010	Ms. Razelle Botha (AIHS)
2010	Mr. Royce Henning (NSERC)
2011	Ms. Simone Kortbeek (NSERC)
2011	Mr. Arthur Lee (USRP)
2012	Mr. Amar Deshwar (AIHS)
2012	Mr. M. Saeed Qureshi (USRP)
2014	Ms. Nabila Mirza
2015	Mr. Hasan Ali
2016	Ms. Feeha Azeem (PURE)
2016-17	Ms. Saba Riaz (AIHS)
2017	Ms. Emily Niu
2018-19	Mr. Andrew Thompson
2018	Ms. Miranda Pachkowski
2017	Ms. Emily Niu

2018	Mr. Eric Fung	2017	Mr. Hidekel Mendoza
2017-18	Mr. Hussain Raza	2019	Mr. Marcus Pehar
2019	Ms. Kiana Jahanbakhsh	2019	Mr. Zain Malik
2019	Mr. Jawwad Zaidi	2019	

Student Mentorship

2004/05	H. Assem (BHSc)	2005	J. Pinglia (BioAlberta)
2004/05	C. Langen (BHSc)	2005	H. Sharma (BioAlberta)
2004/05	C. Kua (BHSc)	2006	R. Bell (BHSc)
2004/05	J. Roang (BHSc)	2006	J. Gee (BHSc)
2006	A. Bucataru (BHSc)	2007	M. Li (BioAlberta) 1st place
2007	H. Wobma (BHSc)	2008	E. Bell (BHSc)
2008	N. Wong (BHSc)	2008	K. Nze (BHSc)
2008	A. Olson (BHSc)	2008	A. Getz (BHSc)
2008	R. Cameron (BHSc)	2008	J. Ho (BHSc)
2009	R. Wang (BHSc)	2009	R. Henning (BHSc)
2009	Abdullah Almugate (BHSc)	2009	Cassandra Fera (BHSc)
2009	David Gaunt (BHSc)	2009	Kaitlin Oxby (BHSc)
2009	Jeanie Quach (BHSc)	2009	Anna-Lena Kuran (BHSc)
2009	Namrata Mathew (BHSc)	2010	Michael Wong (BHSc)
2010	Hyejung Lee (BHSc)	2011	Peter Liu (BHSc)
2012	C. Wintersinger (BHSc)	2012	D. Urrego (BHSc)
2012	J. Spitzmacker (BHSc)	2012	J. Wang (BHSc)
2012	K. Babyn (BHSc)	2012	M. Hlasny (BHSc)
2012	R. Manion (BHSc)	2012	A.Vegso (BHSc)
2013	U. Sajid (BHSc)	2013	P. Podgorny (BHSc)
2013	V. Popa (BHSc)	2013-15	A. Qahtani (BHSc)
2015/16	R. Durrani (BHSc)	2015/16	S. Rothery (BHSc)
2017	H. Mendoza (BHSc)	2017/18	H. Raza (BHSc)
2017/18	S. Wong (BHSc)	2018	J. Cooper (HYRS Student)
2018/19	A. Thompson (BHSc)	2018	M. Pachkowski (BHSc)
2018	U. Azeem (BHSc)	2019	M. Pehar (BHSc)
2019	K. Jahanbakhsh (BHSc)	2019	Z. Malik (BHSc)

ii) GRADUATE STUDENT SUPERVISION

1991-1996 Co-supervisor and Supervisory Committee Member, PhD program, Mr. **Neil Magoski**, Department of Physiology, University of Calgary (successfully defended). Present position: Professor - Queen's University, Canada.

1992-1994 Co-supervisor and Supervisory Committee Member, MSc program, Mr. **Dan Bing Wang**, Department of Physiology, University of Calgary (successfully defended). Present Position: MD, Canada.

1993-1994 Co-supervisor (with Dr. Geraerts - Amsterdam), Ms. **Astrid Van der Sar**, MSc program, Free University, Amsterdam, (successfully defended). Present position: Assistant Professor, Vrije Universiteit, The Netherlands.

1993-1997 Co-supervisor and Supervisory Committee Member, PhD program, Ms. **M. Saver**, Department of Biology, University of Calgary (successfully defended). Present position: Teacher.

1995 Co-supervisor, Mr. **J. Knol**, PhD program, Department of Biochemistry, Free University, Amsterdam, (successfully defended). Present position: Research Associate, Vrije Universiteit, The Netherlands.

1995-1998 Supervisor, Mrs. **Zhong-Ping Feng**, PhD program, (MRC, ALA. (successfully defended). Present position: Professor - University of Toronto, Canada.

1995-2000 Co-supervisor, Mr. **J.Burgman**, PhD program, Department of Biology, Vrije Universiteit, The Netherlands (successfully defended).

1995-2000 Supervisor and Supervisory Committee Member, Mr. **Peter Lovell**, PhD program (successfully defended). Present position: Professor, Daytona State College, USA.

1997-2000 Supervisor, Mrs. **Micki Bjorgum**, MSc program. (successfully defended). Present Position: Teacher.

1997-2001 Supervisor, Ms. **Melanie Woodin**, PhD program (successfully defended). Present position: Associate Professor, University of Toronto, Canada.

1997-1999 Supervisor, Ms. **Zara Haque**, MSc program (successfully defended). Present Position: Teacher.

1997-1999 Co-supervisor, and Supervisory Committee Member, Mr. **Jason Doyl**, MSc program (Successfully defended).

1999-2002 Supervisor, Mr. **David Munno**, PhD program (successfully defended).

2000-2002 Supervisor, Ms. **Deirdre Hennessy**, MSc program, (successfully defended). Present Position: Research Associate, Alberta Health Services.

2000-2005 Co-Supervisor, Mrs. **Ryanne Wiersma**, PhD program Free University of Amsterdam. (Successfully defended).

2000-present Co-Supervisor, Ms. **Zineb El Falali**, PhD program Free University of Amsterdam (In progress).

2001-2002 Supervisor, Ms. **Sabiha Noor**, MSc Biomedical Technology program (successfully defended).

2002-2004 Supervisor, Mr. **David Prince**, MSc program (successfully defended).

2002-2004 Supervisor, Ms. **Nina Van**, MSc program (Successfully defended).

2003-2007 Supervisor, Mr. **Tyler Dunn**, PhD program (Successfully Defended). Present Position: Postdoctoral Fellow, McGill University, Canada.

2004-2007 Supervisor, Mr. **Atiq Ul Hassan**, MSc program (Successfully Defended). Present Position: Assistant Professor, University of Karachi.

2004-2006 Supervisor, Ms. **Jessica Gagatek**, MSc program (Successfully Defended). Present Position: Pharmacist.

2004-2005 Co-Supervisor, Mr. **Thomas Lee**, MSc program (Ophthalmology), University of Alberta (Successfully defended) (CIHR Fellowship Award). Present Position: Ophthalmologist.

2004-2005 Supervisor, Ms. **Batool Kazmi**, MBT program, University of Calgary (Successfully defended). Dentist.

2004-2005 Supervisor, Mrs. **Shehr Bano**, MSc program, University of Calgary (Successfully defended). Present Position: Research Associate, U of A.

2004-2010 Co-Supervisor, Ms. **Kendra Furber,** PhD program, University of Calgary (Successfully defended -May).

2005-2007 Supervisor, Mr. **Patrick McCamphill**, MSc program, University of Calgary (Successfully Defended). Present Position: PhD student, McGill University.

2005-2008 Supervisor, Ms. **Kelly Baehre**, MSc program, University of Calgary (Successfully Defended).

2005-2006 Supervisor, Ms. **Jessica Lee**, MBT program, University of Calgary (Successfully Defended).

2006-2007 Supervisor, Ms. **Elisha Montgomery**, MSc program, University of Calgary (Successfully Defended). Present Position: MD, USA.

2007-2010 Supervisor, Mr. **Louis-Pierre Asselin Jarry**, MSc Neuroscience program, U of C (Successfully Defended - Feb).

2007-2015 Supervisor, Mr. **Collin Luk**, PhD Neuroscience program, U of C (Successfully Defended - March). Present Position: MD Resident, U of A.

2006-2007 Supervisor, Mr. **Eugene Batuyong**, MBT program, University of Calgary (Successfully Defended).

2008-2009 Supervisor, Ms. **Shama Masroor**, MSc Neuroscience program, U of C. (Withdrawn).

2009-2015 Supervisor, Ms. **Nichole Schmold**, PhD Neuroscience program, U of C (Successfully Defended – Dec).

2009-2015 Supervisor, Ms. **Tara Janes**, PhD Cardiovascular program, U of C (Successfully Defended - Dec). Present Position: Postdoctoral Fellow, Laval University, Canada.

2010-2016 Supervisor, Ms. **Angela Getz**, PhD Neuroscience program, U of C (Successfully Defended - Dec). Present Position: Postdoctoral Fellow, University of Bordeaux, France.

2011-2012 Supervisor, Ms. **Joan Stilling**, MSc Neuroscience program, U of C (Withdrawn). Present Position: MD Resident, U of C.

2012-2017 Supervisor, Mr. **Pierre Wijdenes**, PhD Biomedical Engineering program, U of C. (Defended-Sept). Present Position: Postdoctoral Fellow, University of Calgary, Canada

2014-2016 Supervisor, Mr. **Ryden Armstrong**, MSc Neuroscience Program, U of C. (Successfully Defended - June). Present Position: MD Student, U of C.

2014-2016 Co-Supervisor and Supervisory/Thesis Committee Member, **Mr. Michael Purdy**, MSc Biomedical Engineering program, U of C. (Successfully Defended - June).

1990-1993 Supervisory Committee Member, PhD program, Mr. **Ivar Kljavin**: Factors that influence neurite outgrowth from retinal non-projection neurons (successfully defended).

1991-1994 Supervisory Committee Member, Ms. **I. Roger**, MSc program, Department of Physiology, University of Calgary (successfully defended). Present position: Teacher.

1995-1997 Supervisory and Examination Committee Member, Ms. **C. Dunne**, PhD program, (successfully defended).

1995-1998 Supervisory Committee Member, Mr. **Cory Torgerson**, PhD program. (successfully defended). Present position: MD.

2005-2007 Supervisory Committee Member, Mr. **Pim van Nierop**, Free University of Amsterdam, PhD program (Successfully Defended). Present Position: Postdoctoral Fellow, Free University of Amsterdam, The Netherlands.

2007-2010 Supervisory/Thesis Committee Member, Ms. **Carolina Gutierrez Herrera**, MSc program, University of Calgary (Successfully Defended).

2006-2009 Supervisory/Thesis Committee Member, Mr. **Karl Iremonger,** PhD program, University of Calgary (Successfully Defended). Present Position: PDF – New Zealand.

2005-2008 Supervisory/Thesis Committee Member, Mr. **Hameed Shahid**, MSc program, University of Calgary (Successfully Defended).

2007-2008 Supervisory/Thesis Committee Member, **Ms. Rania Mufti**, MSc program, University of Calgary (Successfully Defended).

2007-2008 Supervisory/Thesis Committee Member, **Mr. Songhua Yang**, MSc program, University of Calgary (Successfully Defended).

2001-2004 Supervisory/Thesis Committee Member, Mr. **Hong-Shuo Sun**, PhD (Successfully Defended).

2004-2008 Supervisory/Thesis Committee Member, Ms. **Farrah Rhemtulla**, MSc (Successfully Defended).

2004-2009 Supervisory/Thesis Committee Member, Mr. **Stephen Kemp**, PhD (Successfully Defended).

2008-2009 Supervisory Committee Member, Mr. **Jonathon Davies**, MSc (Successfully Defended).

2009 Thesis Examination Committee Member, Mr. **Matthew Churchward**, PhD Program (Successfully Defended).

2000 External Examiner, Mr. **Asad Khan**, PhD program – McGill University. (Successfully Defended).

2001 Thesis Examination Committee Chair**, Ms. Lysa Boisse**, MSc (Successfully Defended).

2002 Thesis External Examiner, Mr. **Deniyal Siddiqi**, MSc (Successfully Defended).

2003 Candidacy Examination Committee Member, Mr. **Hong-Shuo Sun**, PhD (Successfully Defended).

2005 Neutral Chair for MSc Thesis defense, Ms. **LeeAnne Luft** (Medical Sciences – Successfully Defended).

2006 Thesis Examination Committee Chair, Mr. **Bruce McKay**, PhD (Successfully Defended).

2007 Candidacy Examination Committee Member, Mr. **Matthew Churchward**, PhD Program.

2009 External Examiner, **Ms. Anna Lisa Lucido**, PhD program – McGill University. (Successfully Defended)

2009 External Examiner, **Ms. B. Lise**, PhD program – University of British Columbia. (Successfully Defended).

2009 External Examiner, **Ms. S. Patten**, PhD program – University of Alberta. (Successfully Defended).

2009 Thesis Examination Committee Member, **Mr. Brent Alexander**, MSc Program. (Successfully Defended).

2010 Candidacy Examination Committee Member, **Ms. Pia Cone Christensen**, PhD Program (Oral Exam - Feb 2010).

2010 Neutral Chair for Candidacy Exam, **Ms. Jochen Fahr**, PhD (Medical Sciences – Successfully Defended).

2011 Thesis Committee Member, **Mr. Shuai Zhang**, MSc program, University of Calgary (Oct/11).

2013 Thesis Defense External Examiner, **Ms. L. Yan**, PhD Program, University of Alberta (Apr/13).

2014 Thesis Examination Committee Member, **Mr. Lior Blockstein**, PhD Program – Successfully Defended (May).

2016 Supervisory Committee Member, **Mr. Farhad Ahmad Qureshi**, MSc (Medical Science), University of Calgary (In Progress).

2018 External Examiner, **Ms. Syeda Mariam Siddiqa**, PhD Program (Biotechnology), University of Karachi (In Progress).

2016-present Supervisor, **Ms. Anosha Ulfat**, PhD Neuroscience Program, U of C. (In Progress)

2016-2018 Supervisor, **Ms. Sahar Shahidi**, MSc Neuroscience Program, U of C. (Successfully Defended - November)

2017-present Supervisor, **Ms. Shadab Batool**, PhD Neuroscience Program, U of C (In Progress)

2018-present Supervisor, **Ms**. **Syedah Ali**, PhD Biomedical Engineering Graduate Program, U of C (In Progress)

2018 -present Co-Supervisor, **Ms. Roofia Pishgar**, MSc, Biomedical Engineering Graduate Program

2019- present Supervisor, **Ms. Nerea Jimenez Tellez**, PhD Biochemistry and Microbiology Graduate program (In Progress)

iii) <u>POSTDOCTORAL FELLOWS AND RESEARCH ASSISTANTS</u>

1993-1995 Professor **K. Kawahara**, Research Assistant, Departments of Anatomy and Physiology, University of Calgary. (Japanese Government Fellowship)

1993-1996 **Dr. Takuya Inoue**, Departments of Anatomy and Physiology, University of Calgary. (Japanese Government Fellowship) **(Dr. Inoe was awarded PhD degree from Miyazaki Medical School based on his research completed in Dr. Syed's laboratory.)**

1993-2000 **Dr**. **Gaynor Spencer**, Departments of Anatomy and Physiology, University of Calgary. (AHFMR, University of Calgary, Killam Fellowship). Present position: Associate Professor - Brock University, Ontario.

1995-2000 **Dr**. **Ronald van Kesteren**, Departments of Anatomy and Physiology, University of Calgary, (AHFMR, NATO Fellowship), (Co-supervised with Dr. Bulloch). Present position: Assistant Professor - Free university of Amsterdam, The Netherlands.

1996-1998 Dr. **Toshiro Hamakawa**, Departments of Cell Biology & Anatomy, University of Calgary. (Japanese Government Fellowship) **(Dr. Hamakawa was awarded his PhD from Miyazaki Medical School based on his research completed in Dr. Syed's laboratory).**

1996-2001 **Dr**. **Leonid Moroz**, Departments of Cell Biology & Anatomy and Physiology & Biophysics, University of Calgary. (Howard Hughes Foundation Fellowship, USA), (Supervised with Drs. Bulloch and Lukowiak). Present Position: Assistant Professor, University of Florida, USA.

1996-2001 **Dr**. **Richard Wilson**, Dept of Cell Biology & Anatomy & Physiology & Biophysics, University of Calgary. (AHFMR, Parker B. Francis Fellowship-USA) (Co-supervised with Dr. Remmers). Present Position: Professor, U of C.

1998-2000 **Dr**. **Taro Kawano**, Dept of Cell Biology & Anatomy, University of Calgary. **(Dr. Kawano will be awarded his PhD from Miyazaki Medical School based on his research completed in Dr. Syed's laboratory).**

1998-2005 **Dr**. **David Spafford**, Dept of Cell Biology & Anatomy, University of Calgary. Present Position: Assistant Professor, University of Waterloo.

1998-1999 **Dr**. **Nikita Grigoriev**, Dept of Cell Biology & Anatomy, University of Calgary. (Deceased).

2000-2002 **Dr**. **Hiroaki Naruo**, Dept of Cell Biology & Anatomy, University of Calgary. **(Dr. Naruo was awarded his PhD from Miyazaki Medical School based on his research completed in Dr. Syed's laboratory).**

2002-2004 **Dr**. **Shin Onizuka**, Dept of Cell Biology & Anatomy, University of Calgary. **(Dr. Onizuka was awarded his PhD from Miyazaki Medical School based on his research completed in Dr. Syed's laboratory).**

2004-2007 **Dr. Rudolf Potucek**, Dept. Cell Biology & Anatomy, University of Calgary (Co-supervised with Dr. G. Jullien – Engineering).

2005-2007 **Dr. Harold Bell**, Dept. Cell Biology & Anatomy, University of Calgary (AHFMR). Present Position: Assistant Professor, Central Michigan University, USA.

2007-2012 **Dr. Fenglian Xu**, Dept. Cell Biology & Anatomy, University of Calgary (AHFMR). Present Position: Assistant Professor, St. Louis University, USA.

2015-2017 **Dr. Camilla de Carvalho**, Dept. Cell Biology & Anatomy, University of Calgary.

2017-2018 **Dr. Angela Getz**, Dept. Cell Biology & Anatomy, University of Calgary. Present Position: PDF University of Bordeaux, France

2018-present **Dr. Pierre Wijdenes**, Dept. Cell Biology & Anatomy, University of Calgary

2012-present *PDS Career Advisor*, **Dr. Anand Krishnan**, University of Calgary.

2012-present *PDS Career Advisor*, **Dr. Ranjan Kumar**, University of Calgary.

2014-present *PDS Career Advisor*, **Dr. Jean-Paul Motta**, University of Calgary.

2014-present *PDS Career Advisor*, **Dr. Ivana Souza**, University of Calgary.

iv) RESEARCH TECHNICIAN'S SUPERVISED (Full Time only)

1992-present	Mr. Wali Zaidi	2007-2012	Mrs. Svetlana Farkas-Cubra
1992-1994	Mrs. Aperna Rao	2012-present	Mrs. Jean Kawasoe
1998-2007	Mr. Ishrat Hussain		

TEACHING SUMMARY

My interest in University teaching began in 1983 when I first became an undergraduate teaching assistant in the Department of Physiology, University of Karachi, Pakistan. I found that I enjoyed teaching not only because I was helping others to learn about themselves and the world around them but also because it gave me added incentive to learn as well. These feelings were strengthened during the course of my PhD in the United Kingdom, when I taught medical, dental and physiology undergraduate students for three years. At present, I am involved in teaching medical, graduate and undergraduate students at the University of Calgary. These experiences have proved to me how rewarding teaching profession can be.

My preference is in the teaching of neural development, nervous system anatomy and function, cellular basis of behaviour and medical and comparative physiology. I also specialize in the neurophysiological, behavioural, morphological, electrophysiological imaging and cell culture techniques. However, my interests are wide ranging and I feel competent to teach in other areas such as human anatomy and physiology, and basic biological sciences. I have had experience as either an undergraduate or graduate teaching assistant and as an Assistant Professor in all of the above areas. Moreover, my experimental model system is ideally suited for providing medical and undergraduate students with an unparalleled opportunity to learn modern, state-of-the-art neurophysiological techniques. This approach has several advantages over conventional frog nerve-muscle preparation. For instance, direct and simultaneous intracellular recordings from both pre- and postsynaptic neurons can be made with great east and reliability. Moreover, cell culture techniques can help students understand various development programs at a resolution which is unapproachable elsewhere.

VI. ADMINISTRATIVE RESPONSIBILITIES

i) DEPARTMENTAL

2004 – 2014 Head, Department of Cell Biology & Anatomy
2004 – 2014 Chair, Executive Committee for Cell Biology & Anatomy
1993 – 1994 Departmental Representative to Faculty Association, U of C

ii) FACULTY

1991 – present Member, Medical Faculty Council
1991 – 2006 Member, Respiratory Research Group
1991 – 2006 Member, Neuroscience Research Group
1993 – 1994 Departmental Representative to Faculty Council, Department of Anatomy
1994 – 2006 Member, Developmental Neurobiologist Assistant Professor, Recruitment Committee, Neuroscience Research Group
2001 – 2004 Member, Student's Appeals Committee.
2001 – 2006 Respiratory Research Group Search Committee
2003 – 2006 Member, Cellular and Molecular Neuroscience Research Group
2003 – 2004 Member, Postdoctoral Education Committee
2004 – 2014 Member, Microscopy and Imaging Facility Scientific Steering Committee
2004 – 2010 Member, Neuroscience Graduate Education Committee
2004 – present Member, BHSc Executive Committee
2004 – 2014 Member, CLS User Committee
2004 – 2014 Faculty Representative to the Faculty of Medicine Graduate Student Symposium
2005 – present Member, Alberta Centre for Innovation in Health Technology Strategic Planning Task Force Committee
2005 – 2009 Member, Neurosurgery Search Committee
2005 – present Member, Medical Enrollment Expansion Task Force Committee
2006 – 2008 Member, Accreditation Review Sub-Committee (***Chair 2007/08***)
2006 – present Member, Faculty Promotions Review Sub-Committee
2006 – present Member, Faculty Distinguished Achievement Award Sub-Committee
2006 – 2010 Member, Faculty of Medicine Mentoring Program Review Committee
2007 – present Member, Hotchkiss Brain Institute
2007 – present Member, Hotchkiss Brain Institute Executive Committee
2007 – present Member, Regeneration Node, Hotchkiss Brain Institute
2007 – 2008 Chair, Mentorship Task Force
2007 – 2014 Electron Microscope Agreement Steering Committee
2007 – 2008 Member, Criteria & Policy "New Faculty Mortgage Incentive Program" Committee
2008 – 2009 Research Director, Hotchkiss Brain Institute
2008 – 2010 Member, Pediatric Professorship in Rehab Medicine Search Committee
2008 – present Member, Planning & Priorities Committee
2008 – present Member, Teaching Task Force Committee
2008 – present Member, Education Strategic Planning Committee
2008 – 2009 Member, ICMH Director Search Committee
2009 – present Member, Raising the Bar Subcommittee
2009 – present Member, Gairdner Foundation Symposia Committee
2009 – 2012 Member, Cellular and Molecular Basis of Mental Health Search Committee
2009 – present Member, ACHRI Leadership Group Committee
2009 – present Member, H & S Foundation of AB, NWT & Nunavut Chair in Stroke Research Committee

2009 – 2010 Member, Arthritis Chair in Rheumatic Diseases/Rheumatology Search Committee
2010 – present Member, Undergraduate Medical Education Committee
2010 – present Member, Neuroncology/Neurovascular Neurosurgeon Search/Selection Committee
2011 – 2014 Faculty Chair, Lions Sight Centre Fund Award Committee
2011 – present Member, Healthy Brain Aging Chair Search/Selection Committee
2011 – present Member, Stephenson CMR Director Search/Selection Committee
2012 – 2014 Chair, Motor Systems Behavioural Neurobiologist Search/Selection Committee
2012 – present Member, PURE Awards Review Committee
2012 – present Member, Medicine Leadership Development Task Force Committee
2013 – present Member, Professionalism Council
2013 – present Member, Hotchkiss Brain Institute Education Committee
2014 – present Member, Hotchkiss Brain Institute Technology Committee
2014 – present Member, MRS & Brain Injury Search/Selection Committee (HBI)
2014 – present Member, CAT/Research Infrastructure Committee
2014 – present Member, Cumming School of Medicine Leadership Program
2015 – present Member, Hotchkiss Brain Institute Strategic Research and Innovation Committee
2015 – present Member, Cumming School of Medicine Strategic Research Council
2015 – present Member, Biochemistry & Molecular Biology Bioinformatics Recruitment Committee
2015 – present Member, Center for Advanced Technology Committee
2015 – present Member, Strategic Research Council Committee
2015 – present Member, Strategic Research & Innovation Committee, Hotchkiss Brain Institute
2015 – present CHGI Steering Committee
2015 – present Scientific Advisory Board member, Alberta Children's Hospital Research Institute
2015 – present Alberta Children's Hospital Research Institute Executive Committee Member
2017 – present Admissions Policy Review Committee, CSM

iii) UNIVERSITY

1996 – 1998 Member, University Research Grants Committee
1996 – 1998 Member, University Fellowship Committee
1997 – 1998 Chair, Research and Travel Grants Committee
2001 – 2004 Member, General Faculties Council
2001 – 2004 Member, Academic Program Committee - Faculty of Graduate Studies
2001 – 2004 Departmental Representative [Dept. Anatomy] - Faculty Association
2002 – 2003 Member, Executive Faculty Council, U of C (Elect)
2003 – 2006 Member, Non-Academic Misconduct Committee
2003 – 2006 Member, Steering Committee - General Faculty Council, University of Calgary (Elect)
2004 – 2007 Member, Academic Program Committee (Elect)
2005 – 2006 Member, Faculty of Graduate Studies Review Committee
2007 – 2008 Member, Spousal Hiring Review Committee – Biological Sciences
2008 – 2012 Special Advisor to the VP (Research) on Biomedical Engineering (BME)
2008 – 2010 Chair, BME Executive Committee
2008 – 2011 University of Calgary's CIHR Delegate
2008 – 2009 Member, Polaris Selection Committee
2008 – 2016 Member, Institute Directors Council
2009 – 2013 Member, BME Executive Advisory Committee
2009 – 2013 Member, BME BioVantage Committee
2009 – 2016 Member, VPR Leadership Team
2010 – 2013 Chair, BME Recruitment and Prioritization Committee
2010 – present Member, Schulich School of Engineering Dean Search Committee

2010 – present Member, IBI Professor/iCORE Scholar Selection Committee
2011 – present Member, Research and Development Policy Committee (RDPC)
2011 – present Chair, RDPC Working Group Committee – Institute and Centres
2012 – present Provost's Heads' Advisory Committee
2012 – present Member, Mock MAC CFI Grant Review Committee
2012 – present Member, Haskayne School of Business Dean Search Committee
2012 – 2016 UC Delegate, Canadian Association of Postdoctoral Administrators (CAPA)
2013 – present Member, BioSensor and BioMEMS Selection Committee
2013 – present Member, Entrepreneurship Graduate Focused Education Committee
2013 – present Member, BME Calgary Interim Steering Committee
2013 – present Member, Associate Deans' (Research) Council
2014 – present Member, Schulich School of Engineering Faculty Tenure and Promotion Committee
2015 – present Member, Strategic Research Council, Cumming School of Medicine (CSM)
2015 – present Member, Centre for Advanced Technologies Committee, Cumming School of Medicine
2015 – present Strategic Research and Innovation Committee member, Cumming School of Medicine
2015 – present Member, Center for High Performance Genomics and Informatics (CSM)
2015 – present Chair, Alberta Children's Hospital Research Institute Research & Innovation Com.
2015 – present ACHRI Leadership Group Member
2016 – present Member, Science Faculty, Tenure, Promotions Committee.
2017 – present Member CSM Admissions Policy Review Committee
2018 – present Member, Advisory Review Committee for the Dean, Schulich School of Engineering

VII. PROFESSIONAL ACTIVITIES

i) MEMBERSHIP IN ASSOCIATIONS, SOCIETIES

1990-present Society for Neuroscience
1989-present International Society for Invertebrate Neurobiology
1992-2010 International Society for Neuroethology
1992-2006 Canadian Neuroscience Association
2005-present American Physiological Society
2004-2014 Association of Anatomy Cell Biology Neurobiology Chairpersons (AACBNC)
2007-2014 Canadian Association for Neuroscience (CAN-ACN)
2014-present International Anesthesia Research Society (IARS)

ii) PROFESSIONAL SERVICE

Provincial Grant Panels

Alberta Lung Association
University of Calgary Fellowship Committee
Member, AHFMR Fellowship Advisory Council

National Grant Panels

1998-1999 Assisted MRC (now CIHR) in the selection of Respiratory System Committee Chair
2001-2002 CIHR New Investigator B Peer Review Grant Committee
2002-2003 CIHR New Investigator C Peer Review Grant Committee
2003-2006 AHFMR Postdoctoral Fellowship Committee
2003-2004 CIHR New Investigator C Peer Review Grant Committee
2004-2007 CIHR Neurosciences A Grant Committee
2008-2009 CFI Leading Edge/New Initiatives Multidisciplinary Assessment Committee
2009-2010 CIHR Fellowships Post-PhD Awards Committee

2011-2012 CIHR New Investigator C Peer Review Grant Committee
2012-2013 CFI Leading Edge/New Initiatives Multidisciplinary Assessment Committee
2013-2014 CIHR New Investigator C Peer Review Grant Committee
2015-2016 CIHR Fellowships Post-PHD Awards Committee
2016-2017 CIHR Project Grant Review Committee
2018- 2019 CIHR Fellowship Post-PhD Awards Committee

Academic Promotion Committee Member

Joffre Mercier – St. Catherine's, ON
Full Professorship – Brock University

David Glanzeman – Los Angeles, CA
Full Professorship - UCLA

Stephen Ferguson – London, ON
Full Professorship – UWO

Declan Ali – Edmonton, AB
Full Professorship – U of A

Wayne Sossin – Montreal, QC
Full Professorship – McGill

Amy Tse – Edmonton, AB
Full Professorship – U of A

John Peever – Toronto, ON
Tenure – U of T

Robert Butera – Atlanta, GA
Full Professorship – Georgia Tech

Kurt Haas – Vancouver, BC
Associate Professor – UBC

Mark Yeoman – Brighton, UK
Conferment of Reader – Brighton

Grant Reviews

MRC (Canada)
AHFMR (Canada)
Alberta Lung Association (Canada)
Marsden Fund (Royal Society of New Zealand)
AIHS (Canada)
Austrian National Research Foundation
NSERC (Canada)
NSF (USA)
CIHR (Canada)
Welcome Trust (UK)
MRC (UK)
Israeli Research Foundation

Journal Reviews

TINS
J. Exp. Biol.
J. Comp. Physiol.
J. Neurophysiol.
Eur. J. Neurosci.
J. Microscopy
J. Neurosci.
Brain Research
J. Inv. Neurosci.
J. Comp. Neurol.
J. Neurochem.
PLoS One

Other Reviews

Invited External Reviewer – Dept. Anatomy & Cell Biology, University of Western Ontario, London, ON. November 2009.

Editorial/Scientific Advisory Board Member

Invertebrate Journal of Neuroscience (2000-present)
Journal of Neurophysiology (2000-present)
Pakistan Journal of Neurological Sciences, Pakistan (2006-present)
Field Editor: Encyclopedia of Neuroscience (2006-present)

The Open Anesthesiology Journal – Editor-in-Chief (2007-2009)
The Open Anesthesiology Reviews (2007-2009)
The Open Anesthesiology Letters (2007-2009)
Ratner Biomedical Inc. Science Advisory Board (2008-present)
The Journal of Neural Plasticity (2009-present)
University of Ottawa Biosciences Institute Advisory Board (2010-present)
Zymetrix – Bose Biomaterials and Tissue Engineering Technology Development Centre Advisory Board – **Chair** (2011-present)

iii) OTHER NOTABLE ACTIVITIES

Visiting Scientists Hosted

Dr. Bill Milson (Canada)
Dr. G. Mitchell (USA)
Dr. J. Feldman (USA)
Dr. J. Blankenship (USA)
Dr. A. Salverston (USA)
Dr. G. Funk (New Zealand)
Dr. P. Stein (USA)
Dr. W. Winlow (UK)
Dr. J. Van Minnen (Netherlands)
Dr. S. B. Kater (USA)
Dr. J. Byrne (USA)
Dr. R. Stephenson (Canada)
Dr. V. Straub (UK)
Dr. N. Kleckner (USA)
Dr. G. Smit (Netherlands)
Dr. P. Smith (Canada)
Dr. G. Metz (Canada)
Dr. M. Charlton (Canada)
Dr. D. Juncker (Canada)
Dr. D. Richter (Germany)
Dr. A.D. Murphy (USA)
Dr. P. Dickinson (USA)
Dr. P. Drapeau (Canada)
Dr. N. Tublitz (USA)
Dr. M. Burrows (USA)
Dr. D. Sandeman (Australia)
Dr. J. Duffin (Canada)
Dr. D. Glanzman (USA)
Dr. G. Nagle (USA)
Dr. M. Poo (USA)
Dr. M. Yeoman (UK)
Dr. L. Kaczmarek (USA)
Dr. W. Sossin (Canada)
Dr. A. Tse (Canada)
Dr. G. Fridman (USA)
Dr. J. MacDonald (Canada)
Dr. R. Butera (USA)
Dr. F. Tse (Canada)

Professional Development - Workshops, Symposia, Other

- Presented a Cell Culture Techniques Workshop at Free University, Amsterdam
- Presented a Cell Culture Techniques Workshop at Hokkaido University, Japan
- Presented a Cell Culture Techniques Workshop at Sussex Center for Neuroscience, Sussex, U.K.
- Presented a Cell Culture Techniques Workshop at Friday Harbor Laboratories
- Coordinated the CSM Mock Faculty Recruitment Event – June 2014
- Coordinated the Abdus Salam Symposium – June 2015

***Biomedical Engineering Delegate Events*:**

- ***GE & Canada Day Visit and Tour*** *– New York, USA*
  Attended as a Canadian Delegate – November 2008.
- ***Life Science Alley Conference and Expo*** *– Minnesota, USA*
  Attended as an Alberta Delegate – December 2008.
- ***Centre for the Advancement of Health Innovations*** – Montreal, Canada
  Attended as a U of C Delegate – January 2009.
- ***Alberta Health and Wellness: Stakeholder Forum*** – Edmonton, Canada
  Attended as a U of C Delegate – April 2009.

- **Joint U of C/F of M Recruitment Meeting (Polaris)** – Montreal, Canada
  Attended as a U of C Delegate/F of M Delegate – June 2009.
- **Canada/China Collaborations Meeting** – Beijing, China
  Attended as a U of C Delegate – September 2009.
- **Pan-Alberta BME Workshop** – Banff, Canada
  Co-hosted the event as BME Delegate – October 2009.

Technology Development and Patents
- Founding member of Neurosilicon Incorporated
- Leadership Team Member – Neurosilicon Inc.
- Board Member, Neuraura – A Calgary, Start up Company.

U.S. Patent Application No. 60/689,645 - Filing Date: June 10, 2005
Fish & Richardson P.C. Reference Number: 1904-002P01
Title: ***Antiepileptic Screening***
Applicants: Drs. Graham Jullien, Naweed Syed and Gerald Zamponi

U.S. Patent Application No. 60/691,322 – Filing Date: June 15, 2005
Fish & Richardson P.C. Reference Number: 19040-005P01
Title: ***Peripheral Nerve Regeneration***
Applicants: Drs. Graham Jullien, Naweed Syed

U.S. Patent Application No. 60/699,829 - Filing Date: July 15, 2005
Fish & Richardson P.C. Reference Number: 19040-006P01
Title: ***Guided Growth Chip***
Applicants: Drs. Graham Jullien, Naweed Syed

EU Patent Application No. 17738065.6 – 1132 – Filing Date: August 20, 2018
Title: **A Microelectrode And Microelectrode Array For Detecting, Recording, Stimulating Or Monitoring Activity Of Electrically Excitable Cells**
Applicants: Naweed Syed3

Media Communications (A few selected from several hundred interviews, reports, talk shows etc. For an extensive overview, please check Dr. Naweed Syed using a Google Search Engine.

October 1990 Science AAAS (USA)
February 1991 The Calgary Herald, Sunday Magazine
April 1991 The Medical Post, Toronto
April 1991 Catalyst, Calgary
October 1991 Resource, Toronto
July 1992 Canadian Science, Toronto
1992 CBC Television, Canada
1992 CFCN Prime Time News, Alberta
January 1993 AHFMR Newsletter, Alberta
March 1993 The University of Calgary Gazette, Calgary
1993 Second Wind, a publication of The Alberta Lung Association
1993 Channels 2 and 7, Calgary Television Networks, Alberta
January 1995 Sunday Sun, Calgary

January 1996 The University of Calgary Gazette
1996/1997 Access Network, Alberta
1996/1997 CBC Radio, Calgary, Edmonton, Vancouver, Ottawa, Montreal, New Brunswick
March 2001 All national and many international television and radio stations and newspapers ran cover story
2002 Front page story covered in Calgary Herald, Edmonton Journal and National Post.
2002 Global TV
2003 CFCN, A-Channel, Shaw Cable Channel, Herald, National Post
February 2004 National Television and Radio stations and newspapers ran cover story (Silicon brain chip technology)
February 2004 Discovery Channel – "*Microchip 'talks' to Brain Cells*".
February 2004 CBC Radio Quirks and Quarks: http://www.cbc.ca/story/news/national/2004/02/19/brain_chip040219.html
February 2005 The Scientist magazine – "*Mind over Machines*" article.
April 2005 University Affairs News – "*Nerves on a Chip*" article.
April 2005 National Review of Medicine – "*Silicon Brain Chip Technology*" article.
July 2005 Alberta Heritage Foundation for Medical Research News – "*Effects of Mercury on Snail Brain Neurons*" article.
October 2005 Time Magazine article "*Mind over Matter*" 166(15):49, 2005.
October 2006 The Calgary Herald – "*Brain Science goes Binary*" article.
January 2007 The Calgary Herald – "*Raising an Autistic Child*" article.
February 2008 CBC Radio – Science Café Interview with Jeff Collins, "*Strokes and Brain Injuries to Cyborgs*"
March 2008 Local and national television, radio and newspapers ran cover story – "*nerve regeneration chip research"*.
August 2008 Local and national television, radio and newspapers ran HYRS Calgary story - "*HYRS student investigates MSG's impact on the brain"*.
March 2009 Telegraph.co.uk online newspaper article "*Hi-tech health care's future*".
April 2009 The Hills Times parliament newspaper article "*BME provides opportunity to reduce health care costs, improve service*".
October 2009 Merritt News article: "*Safety of mercury in flu shots inconclusive*".
June 2010 Calgary Herald article: "*Paralyzed U of C student seeking her own cure*".
August 2010 Globe and Mail article: "*Calgary Scientist to create human 'neurochip'*.
August 2010 Local, national and international television, radio and newspapers cover story: "*Neurochip Technology"*.
Sept. 2011 Shaw TV *"Neurochip Technology".*
March 2012 Calgary Herald *"Biomedical innovators wanted in Calgary"*.
June 2014 Thereelcan.com "Neurochip Technology" http://www.thereelcan.com/2014/06/this-new-function-perspectives-on-humanity-within-digital-societies-benjamin-ross-hayden/
June 2016 UCalgary Medicine Magazine Spring Edition – "*Making a habit of success"*.
October 2016 Local, national and international media cover story: "*Neuro chip records brain cell activity".*
October 2016 *CBC Radio Interview: "Neuro chip records brain cell activity".*

Highlighted links to various News, TV and Print Media postings.

http://www.ucalgary.ca/news/uofcpublications/RIA_fall08/RIA-Syed/
https://www.youtube.com/watch?v=IwoYZmm3prU

https://www.youtube.com/watch?v=hUVh_NDJNS4
https://www.youtube.com/watch?v=VNXfF9-lZp0
https://omny.fm/shows/the-morning-news-with-gord-gillies/brain-chip-technology
https://www.theglobeandmail.com/life/health-and-fitness/calgary-scientists-to-create-human-neurochip/article1368807/
https://www.digitaltrends.com/cool-tech/bionic-hybrid-neuro-chip/
https://www.news-medical.net/news/20161026/New-bionic-hybrid-neuro-chip-records-brain-cell-activity-at-higher-resolution.aspx
http://www.defaultlogic.com/learn?s=Neurochip
https://tectodate.com/brain-machine-interface/
https://www.epilepsyresearch.org.uk/neuro-chip-could-help-scientists-identify-drugs-that-work-best-to-treat-epilepsy/
http://www.telegraph.co.uk/technology/4947958/Hi-tech-health-cares-future.html
https://www.sciencedaily.com/releases/2010/08/100810094619.htm
https://www.ucalgary.ca/utoday/issue/2016-10-27/neuro-chip-developed-university-calgary-records-brain-cell-activity-higher
https://www.ctvnews.ca/biochip-weds-brain-cells-and-electronics-1.541445
https://www.dawn.com/news/1282537
https://www.thestar.com/life/health_wellness/diseases_cures/2010/08/11/braincell_microchip_lets_scientists_listen_as_neurons_talk.html
https://dailytimes.com.pk/62622/silicon-chips-used-for-fresh-insights-into-alzheimers-disease/

https://gadgets.ndtv.com/science/news/human-brain-on-a-microchip-nearly-ready-227203
http://www.thehindu.com/sci-tech/technology/Human-brain-on-a-microchip-nearly-ready/article16127896.ece
http://www.pressreader.com/canada/calgary-herald/20120802/281913065248991
https://www.popsci.com/science/article/2010-08/new-neurochip-will-help-scientists-study-brain-minute-detail
http://insights.globalspec.com/article/3574/bionic-chip-will-aid-study-of-neurological-diseases
https://www.canada.ca/en/news/archive/2010/08/news-releases-neurochip-technology-developed-canadian-team.html?=undefined&wbdisable=true
https://www.worldhealth.net/news/nerve_cells_grown_on_a_microchip_communi/
Billboards
https://globalnews.ca/news/3349703/how-a-calgary-brain-researcher-used-a-scientific-award-to-help-victims-of-terrorism/
http://www.foxnews.com/tech/2011/07/12/neuron-whisperers.html
https://infosigma.wordpress.com/2015/01/01/what-is-neurochip/
https://www.electronicproducts.com/Biotech/Research/New_hybrid_neuro_chip_blends_biology_with_electronics_to_record_brain_activity_in_real_time.aspx
http://www.cbc.ca/news/canada/calgary/university-calgary-naweed-syed-pakistan-brain-chip-1.4037772
https://www.nextbigfuture.com/2010/08/university-of-calgary-develops.html
https://ca.news.yahoo.com/university-calgary-neuro-chip-offers-224510037.html
https://www.the-scientist.com/?articles.view/articleNo/16223/title/Mind-Over-Machines/
https://trending.pk/2017/03/pakistani-scientist-turned-billboards-using-face-scholarships-pakistani-kids/
http://www.ucalgary.ca/news/march2008/syed-nerve-cells
http://www.thereelcan.com/2014/06/this-new-function-perspectives-on-humanity-within-digital-societies-benjamin-ross-hayden/
http://calgary.marchforscience.ca/meet-our-speakers/
http://www.thegauntlet.ca/university-of-calgary-professor-honoured-with-pakistani-medal-of-honour/

https://www.ucalgary.ca/utoday/issue/2017-12-15/ucalgary-prof-naweed-syed-awarded-senate-150-medal
https://www.ucalgary.ca/utoday/issue/2017-03-22/surprise-what-do-you-do-when-your-picture-pops-dozens-billboards-pakistan
https://www.ucalgary.ca/utoday/issue/2016-08-19/researchers-use-silicon-chip-technology-fresh-insights-alzheimers-disease
http://www.ucalgary.ca/news/utoday/august10-2010/neurochip
https://www.ucalgary.ca/utoday/issue/2016-10-27/neuro-chip-developed-university-calgary-records-brain-cell-activity-higher
http://cumming.ucalgary.ca/news/ucalgary-professor-awarded-senate-150-medal

Positions of Responsibility

1976-1977 Councilor, University of Karachi Student Union
1977-1978 Elected General Secretary, Physiological Society, University of Karachi, Pakistan
1977-1978 Magazine Secretary, Physiological Society, University of Karachi, Pakistan
1979-1980 Chairman, Pakistan Liberal Student Organization
1980-1984 President, Karachi Sheri Mahaz (a social welfare organization)
1980-1984 General Secretary and Magazine Secretary, Al-Mustafa (a social welfare organization)
1985-1986 President, Pakistan Society, Leeds University Union, Leeds, UK
1988-1990 General Secretary, Hussaini Association of Calgary, Alberta Canada
1990 -1997 Vice President, Hussaini Association of Calgary, Alberta Canada
1998-2012 President, Hussaini Association of Calgary, Alberta Canada
2001- 2012 Member, Board of Trustees, Hussaini Association of Calgary
2001- 2017 Member, CHR Pastoral Care Committee, Calgary, Alberta Canada

Sports and Hobbies

I played for the school and college field hockey and table tennis teams. As well, I played for Leeds University Field Hockey team. I continue to play recreational field hockey. I also occasionally write articles for several Urdu daily newspapers.

VIII. RESEARCH SUPPORT

Date	Support	Project Title	Amount
Current			
2016 – 2021	CIHR	Synapse Formation: The role of MEN1 gene	$863,885
2016	NSERC RTI	Novel Brain-chip Technology Development	$149,462
2015 - 2020	ACHF ($2.5 M)	Pediatric Pain Research Program (my portion)	$375,000
2015 - 2020	NSERC	Mechanisms underlying short-term synaptic plasticity	$140,000
Previous			
1991 - 1992	U of C	Growth cone behaviour	$10,000
1991 - 1992	ALA	Respiratory behaviour	$20,000
1992 - 1994	AHFMR	Synapse formation	$202,000
1991 - 1992	Banting Found.	Regeneration	$17,500
1992 - 1993	ALA	Respiration	$10,000
1993 - 1994	Sloan Foundation	Synapse formation	$38,000
1994 - 1995	ALA	Respiratory rhythmogenesis	$15,000
1994 - 1995	U of C	Synapse formation	$7,000
1994 - 1996	NATO (Co-PI)	Photoreceptors in Aplysia	$10,000
1994 - 1998	NSERC	Growth cone & synapse formation	$100,000
1995 - 2000	How. Hughes (Co-PI)	NO-in *Lymnaea*	$15,000
1995 - 1998	MRC	Respiratory rhythmogenesis…	$165,000
1995 - 1996	AHFMR	Patch clamp set-up	$86,000
1995 - 1996	ALA	Respiration	$20,000
1996 - 2001	NIH (Co-PI)	Neural control of locomotion....	$350,000
1996 - 1997	U of C (Co-PI)	Ion channel analysis	$10,480
1997 - 1998	AHFMR (Co-PI)	Ca imaging set up	$86,000
1997	U of C	Anesthetics & synaptic transmission	$6,000
1997 - 1998	AHFMR	Synapse formation	$30,000
1998 - 1998	AHFMR	Time lapse imaging set-up	$45,000
1998 - 1999	NATO (Co-PI)	Anesthetics	$8,000
1998 - 2001	MRC	Synapse formation	$230,862
1998 - 2001	MRC	Neural control of breathing	$163,731
1998 - 2001	NSERC	Growth cone behaviour	$114,000
2001 - 2006	CIHR	Neural control of breathing	$415,000
2001 - 2006	CIHR	Cellular and molecular mechanisms…	$620,000
2001	CIHR	Equipment Grant	$24,000
2001	AHFMR	Major Equipment Grant	$50,000
2002 - 2007	NSERC	Glia-neuron interactions	$255,000
2002	NSERC	Equipment Grant	$150,000
2002 - 2005	CIHR (Co-PI)	Analysis of synaptic proteins	$150,000
2002	AHFMR	Equipment Grant	$30,000
2005	AHFMR	Major Equipment Grant	$150,000
2006	NSERC	Equipment Grant	$150,000
2008- 2010	NSERC	Glia-neuron interactions	$54,000

Date	Support	Project Title	Amount
2006-2011	CIHR	Neural control of respiration	$533,000
2006-2011	CIHR	Synapse formation and synaptic plasticity	$669,605
2007-2012	CIHR ($2.25 M)	Brain-chip regeneration conduit (my portion)	$350,000
2012 - 2013	CIHR	Synapse formation and synaptic plasticity	$100,000
2010-2015	NSERC	Synaptic plasticity between identified neurons	$165,000
2015 - 2016	CIHR	Synapse Formation	$100,000
2011 - 2016	CIHR	Neural control of respiration	$591,775

Abbreviations: ALA: Alberta Lung Association; CIHR: Canadian Institutes of Health Research; Sloan: Alfred P. Sloan Foundation; AHFMR: Alberta Heritage Foundation for Medical Research; NSERC: Natural Sciences and Engineering Research Council of Canada; NIH: National Institutes of Health; MRC: Medical Research Council of Canada (now CIHR).

RESEARCH INTERESTS

In my research, I utilize modern, state-of-the-art electrophysiological, patchclamp, time-lapse video and fluorescence imaging, brain-chip interfacing, cell culture and molecular biological techniques to elucidate cellular, synaptic and molecular mechanisms of rhythmogenesis and nervous system development in a wide variety of vertebrate and invertebrate species.

My prime interest is in the cellular and molecular basis of rhythm generation and specific synapse formation, nerve regeneration, synaptic plasticity, neurodegeneration and brain repair.

In collaboration with our colleagues at the Max Plank Institute in Germany as well as NRC Canada, we have successfully interfaced neuronal chemical synapses with semiconductor chips. These techniques have since been further developed in our laboratory to create new intellectual property (IP) resulting in several patents and a spin off company (Neurosilicon Inc.). In addition to various brain-chip conduits, we have developed novel multidisciplinary technologies to promote nerve regeneration and nervous system repair. Several prototypes are available which will soon be ready for commercialization. This approach now allows us to simultaneously monitor neuronal activity from a large ensemble of neuronal circuits. Moreover, these chips may be ready for transplantation in animals and humans to drive artificial prosthetic devices. I believe that because natural replacement of injured nervous system tissue does not occur, the only way for us to regain lost brain function is through the development of novel brain-chip interfacing techniques. Development of novel technologies and their commercialization is pivotal to the survival of any innovative savvy institute and the nations.

Keywords: neurodevelopment, trophic factors, regeneration, neural networks, synapse formation, rhythmogenesis, *in vitro* cell culture, transplantation, rhythmic behaviours, neuronal excitability, brain-chip interfacing.

Following are the most important aspects of my research especially those considered unique and innovative:

1. First successful attempt to reconstruct a pattern generator *in vitro*. This paper was accompanied by an editorial review entitled "High Culture of Neuroscience" in **Science** [1990; 250: 282-285]. Similarly, the Medical Post (Toronto), CBC, CFCN, 2 and 7 News and Calgary Herald ran cover stories on the significance of this research. This work has been the focus of many text books and review articles and provides direct insights into the cellular and synaptic basis of rhythm generation.
2. First successful demonstration that a single transplanted neuron restores the deficit in the respiratory behaviour via integrating into host circuitry. This work was published in **Neuron** accompanied by a cover picture. These studies on one hand have allowed us to test the involvement of individual neurons in the control of respiratory behavior, on the other hand they may help to develop techniques to perform successful brain cell transplants in the higher animals. [Syed et al.; 1992, **Neuron** 8: 767-774 - with cover picture]. This work has also been the focus of many review articles and book chapters.
3. Identification and characterization of the first neurotrophic factor from an invertebrate species. [Fainzilber et al.; 1996, **Science** 274: 1540-1543] These studies are important because the identified *Lymnaea* trophic factor also binds to the vertebrate p75 receptor, suggesting that the mechanisms underlying neurotrophic receptor-induced neurite outgrowth may be common and fundamental to both vertebrates and invertebrates. A further characterization of such trophic molecules will, therefore, elucidate how neurotrophic factors and their receptors function in vertebrates.
4. First direct evidence for *de novo* protein synthesis in isolated axons. [van Minnen et al.; 1997, **Neurosciences** 80: 1-7, 1997]. These studies provide unequivocal evidence that specific proteins can be synthesized by neurons and their axons from various injected mRNA molecules. Recently, we have also demonstrated that a membrane bound, G-protein coupled receptor can also be expressed in

the isolated axon of *Lymnaea* neurons [Spencer, et al., **J. Neurobiology** 44:72-81, 2000]. These studies are important because on one hand they change our current view regarding the exclusive nature of protein synthesis in a neuronal cell body, and on the other hand, they provide an unparalleled opportunity to examine the role and specificity of *de novo* protein synthesis in the extrasomal regions.

5. Utilizing soma-soma synapses between identified *Lymnaea* neurons, our laboratory has provided the first direct evidence that both inhibitory [Feng et al., 1997, **J. Neuroscience** 17 (20): 7839-7849, 1997] and excitatory synapse formation [Hamakawa et al, **J. Neuroscience** 19(21): 9306-9312 1999 and Woodin et al., 1999, **Learning and Memory** 6:307-316, with cover picture] is differentially regulated by extrinsic trophic factors. These studies have extended the role of neurotrophic factors from neuronal survival, outgrowth to synapse formation and synaptic plasticity. We have provided the first direct evidence that the trophic factors-induced plasticity and specificity of excitatory synapse formation requires de novo protein synthesis, transcription and is mediated via receptor tyrosine kinases. Most importantly, these studies demonstrated that in the absence of specific trophic factors, not only do appropriate excitatory synapses fail to develop but that the neurons establish inappropriate inhibitory synapses which we have referred to as "default" synapses. The default synapses can however be corrected by the addition of appropriate trophic factors. These studies, taken together have allowed us to propose a **novel concept** in the filed of neurodevelopment and synapse formation. [Woodin et al. 2002 **J. Neuroscience** 22(2):505-514, 2002]. Fura-2 and 2 Photon laser imaging techniques were subsequently used to demonstrate that the voltage-induced Ca^{2+} hotspots develop in the presynaptic cell during synapse formation, and that these hotspots are target-cell and contact site specific [Feng et al., **J. Physiology (London)** 539(1):53-65, 2002].
6. Utilizing individually cultured pre and postsynaptic neurons, we have provided the first direct evidence that the specificity of target cell selection is determined at the growth cone level and that it involves transmitter- receptor interactions between the growth cones. This study underscores the importance of transmitter/receptor interactions between growth cones in target cell selection that leads to specific synapse formation in the nervous system [Spencer et al., 2000, **J. Neuroscience** 20:8077-8086]. This work has already become a major component of the distant learning program aired by the Access Television Network.
7. First direct evidence that neurite outgrowth and synapse formation are differentially regulated by NGF and CNTF [Syed et al. 1996, **J. Neurobiology** 29: 293-303].
8. Identification and characterization of a novel glia-derived acetylcholine-binding protein that modulates synaptic transmission between cultured *Lymnaea* neuron. [Smit et al. 2001, **Nature** 411:261-268 - article accompanied by **News Views** 252-253]. These findings will play an essential role in developing therapies for learning and memory disorders that involve cholinergic transmission.
9. Synapse formation between central neurons requires postsynaptic expression of the *MEN1* tumor suppressor gene. [van Kesteren et al. 2001, **J. Neuroscience** 21:RC161(1-5)]. This study is the first to identify a synapse specific gene whose molecular perturbations were shown by us to suppress synapse formation.
10. In collaboration with the Max-Plank Institute (Münich), we are the first group to interface an artificial semi-conductor chip with an identified neuronal network that was reconstructed on the chip. This research now opens a new avenue whereby we would be able to fabricate neurocomputers with living cells that amend semi-conductor chips or to implant microchips in the brain for medical prosthetics. [Kaul et al. 2003, **Physical Review Letters** - 92(3):038102(4), 2004]. This approach would enable us to manage pain, addiction and epilepsy through the chip implants and will revolutionize the way medicine is practiced in the near future. This study was highlighted in Time magazine and on the Discovery Channel.
11. In collaboration with the National Research Council of Canada (NRC) we are also the first team to develop two novel patch clamp chips that now permit ion channel analysis at a resolution never

achieved before [Py et al. 2010, **Biotech. & Bioeng**, Early View DOI 10.1002/bit.22834; Martinez et al. 2010, **Biomed. Microdevices** Online First DOI 10.1007/s10544-010-9452-z]. This breakthrough in technology development recently made headlines around the world (Globe & Mail, CBC National, Fox News, National Post and several hundred technology breakthrough media outlets – August 2010).

12. In collaboration with a British team, we have also developed a novel chip that allows us to detect transmitter release from neuronal somata to its axons and the terminal [Patel et al., **Analyst** 138:2833-2839, 2013]. This approach has tremendous potential for deep brain stimulation approaches. In collaboration with Dr. Orly Yadid-Pecht from the Faculty of Engineering - U of C, we have also developed a lab on a chip technology that allows contact imaging of brain cells without currently available expensive and extensive technologies [Blockstein et al., **Photonics Journal** 4:1004-1012, 2012].
13. My lab is also the first to identify MEN1- a tumor suppressor gene that regulates many aspects of synapse formation, synaptic plasticity and neurodegeneration in the brain. MEN1 function was shown by us to be regulated by trophic factor mediated, and activity-dependent mechanisms. These studies have tremendous potential for insights into Alzheimer's disease (Getz et al, 2015, 2016 Nature Scientific Reports).

1. Mercury-induced toxicity of rat cortical neurons is mediated through NMDA receptors. [Xu, F., Farkas, S., Kortbeek, S., Zhang, F.X., Chen, L., Zamponi, G., **Syed, N.I**. Mol. Brain 5:30, 2012].

- Using cell culture and conventional patch clamp techniques, we demonstrated that $HgCl_2$ induces neurodegeneration of rat cortical neurons and that these effects are mediated through an over-activation of NMDA receptors which leads to cytoskeleton instability. This study provided direct evidence that indeed mercury causes neurodegeneration and that it is a potent neurotoxic agent. *XF, FF, SK were my trainees, FXC, CL and GZ are our collaborators.*

Silver nanoparticles (AgNPs) cause degeneration of cytoskeleton and disrupt synaptic machinery of cultured cortical neurons. [Xu, F., Piett, C., Farkas, S., Qazzaz, M., **Syed, N.I.** Mol. Brain 6:29, 2013].

- This study provided first direct evidence that AgNPs induce toxicity in rat cortical neurons and that these effects involved degradation of cytoskeleton, perturbation of both pre- and postsynaptic proteins and mitochondrial dysfunction leading to cell death. Our study clearly established the harmful effects of AgNPs and warned against its prolific use either for general use or in drug design. *All authors listed here were my trainees.*

14.

IX. INVITED ADDRESSES

1. Department of Physiology, University of Alberta, 1990.
2. Department of Zoology, Washington State University, USA, 1990.
3. Department of Physiology, University of Buffalo, USA, 1990.
4. Department of Pediatrics and Respiratory Physiology, Yale, USA, 1991.
5. Respiratory Physiology Research Group, University of Calgary, 1991.
6. Reproductive Medicine Research Group, University of Calgary, 1991.
7. Canadian Science Writers' Association Annual General Meeting, Calgary, 1991.
8. The SEB symposium on *Neurons in Culture*, Lancaster, UK, April 1992.
9. Special Symposium organizer and speaker at the Third International Congress of Neuroethology, McGill University, Canada, August 1992.
10. Alberta Children's Hospital, Calgary, September 1992.
11. Department of Zoology, University of Alberta, 1992.
12. Department of Physiology, University of Leeds, UK, 1992.
13. Sussex Centre for Neuroscience, Sussex, UK, 1993.
14. Department of Biology, University of Calgary, 1993.
15. Department of Zoology, University of Alberta, 1993.
16. Department of Biology, Free University, Amsterdam, Netherlands, 1994.
17. Department of Cell Biology and Anatomy, School of Medicine, University of North Carolina, Chapel Hill, USA, 1994.
18. Pfizer Mini-Symposium, Control of Respiration, held in Calgary. 1995.
19. Comparative Physiology and Biochemistry, meeting Birmingham, UK. 1995.
20. Invited Symposia Speaker, Society for Neuroscience Meeting, San Diego, USA. 1995.
21. Department of Biochemistry, Free University, Amsterdam. 1995.
22. Department of Biological Sciences, University of Alberta. 1995.
23. John Hopkins Marine Station, Stanford University, USA. 1995.
24. Department of Biological Sciences, State University of New York, Albany, USA. 1996.
25. Department of Biology, Bowdoin College, Main, USA. 1996.
26. Invited Speaker, American Physiological Society Meeting, Madison, Wisconsin, USA. 1996.
27. Graduate School of Science, Hokkaido University, Japan 1996.
28. Miyazaki Medical College, Japan 1996.
29. Department of Physiology, University of Toronto, 1996.
30. Holton Memorial Lecture, University of Toronto, 1996.
31. Manama Medical School, Bahrain 1997.
23. Friday Harbor Laboratories, USA 1997.
33. 5th International Conference on Invertebrate Neurochemistry and Neurophysiology (ICINN) Symposium - "*Plasticity, Regeneration and Degeneratio*n", Eilat, Israel 1997.
34. Department of Zoology, UBC - Vancouver, 1998.
35. Invited Course Instructor - "*Cellular and molecular neurobiology*", Friday Harbor Laboratories, USA 1998.
36. 1999 Congress on *In Vitro* Biology Symposium - "*In vitro reconstruction of neuronal network underlying respiratory rhythmogenesis in Lymnaea Stagnalis*". New Orleans, USA 1999.
37. Invited Keynote Symposia Speaker: The Netherlands Neuroscience Meeting, Amsterdam, 2000.
38. Invited Symposia Speaker: Canadian Zoological Society meeting, New Brunswick, 2000.
39. Invited Speaker: Department of Biological Sciences, University of Central Lancashire, UK "*Neural control of breathing*". May 2001.
40. Invited Speaker: Max Planck Institute, Münich, Germany. "*Trophic factor in synapse formation*". May 2001.

41. Invited Speaker: Central European Conference of Neurobiology, Krakow, Poland, August 2001.
42. Invited Speaker: Brain Research Centre - UBC "*Synapse development and plastici*ty", Victoria, December 2001.
43. Invited Speaker and Organizer: University of Central Lancashire, England, UK. *"Brain and breathing: snail sets the pace"* May 2002.
44. Invited Speaker and Organizer: University of Central Lancashire, England, UK. *"Synapse formation and plasticity"* May 2002.
45. Invited Speaker: University of Brighton, UK. *"Synaptic competition during early synapse formation"* May 2002.
46. Invited Speaker: University of Sussex, UK. *"Trophic factor-induced plasticity of synapse formation"* May 2002.
47. Invited Speaker: University of Florida Whitney Labs. *"Synaptogenesis in a model system"* June 2002.
48. Invited Keynote Speaker: International Toxicology Meeting, Calgary. *"How mercury causes brain nerve degeneration*" September 2002.
49. Invited Speaker: Sir Winston Churchill High School (Calgary Board of Education) "*Brain Research*" June 2003.
50. Invited Speaker: Biomedical Treatments for Autism and PDD, Calgary. *"How Mercury Causes Brain Nerve Degeneration"* Aug 2003.
51. Invited Speaker: St. Elizabeth Seton Junior High School (Calgary Catholic Board of Education), Calgary. "*How Does the Brain Work?*" October 2003.
52. Organized a field trip for 14 students from St. Elizabeth Seton Junior High School (Calgary Catholic Board of Education) to my laboratory including a BACS centre tour October 2003.
53. Invited Speaker: Marion Carson Elementary School (Calgary Board of Education), Calgary, November 2003 "*Researching the Brain*" November 2003.
54. Invited Speaker: Psychology Department, University of Calgary. "*Synaptic Plasticity*" February 2004.
55. Department Head Candidate Seminar: Cell Biology & Anatomy, University of Calgary. "*Novel Insights into Synaptic Plasticity*" February 2004.
56. Invited Speaker: University of Karachi, Pakistan, "*Interfacing Brain Cell Function with Silicon Chip Technology*" July 2004.
57. Invited Speaker: University of Sussex, UK, "*Novel Insights into Synaptic Plasticity*" August 2004.
58. Invited Speaker: Biology Department, McMaster University. "*Novel Insights into the mechanisms of short-term synaptic plasticity underlying working memory*" October 2004.
59. Invited Speaker: Biology Department, University of Toronto. "*Novel Insights into the mechanisms of short-term synaptic plasticity underlying working memory*" October 2004.
60. Invited Speaker: Clinical Neurosciences Grand Rounds, Foothills Medical Centre, Calgary. "*Interfacing Brain Cell Function with Silicon Chip Technology*" November 2004.
61. Invited Speaker: NIH special program, Bowdoin College, Maine – USA. "*Interfacing Brain Cell Function with Silicon Chip Technology*" March 2005.
62. Invited Speaker: NIH special program, Bates College, Maine – USA. "*Interfacing Brain Cell Function with Silicon Chip Technology*" March 2005.
63. Invited Speaker: NIH special program, Colby College, Maine – USA. "*Interfacing Brain Cell Function with Silicon Chip Technology*" March 2005.
64. Invited Speaker: Calgary Council for Advanced Technology, Calgary. "*Interfacing brain cell function with silicon chip technology*" April 2005.
65. Invited Speaker: Journal of Experimental Biology Meeting - Downing College, Cambridge, UK. "*The Brain Plasticity at the Base of Neuron – Silicon Interface*" September 2005.

66. Invited Speaker: Faculty of Medicine PubMed Series, Calgary. "*Synaptic plasticity underlying learning and memory: from brain to silicon chips!"* October 2005.
67. Invited Speaker: Biomedical Engineering Student Society, Calgary. "*Neuron-semiconductor chips"* November 2005.
68. Invited Speaker: Miyazaki Medical College Grand Lecture, Miyazaki, Japan. "*Anesthetics treatment blocks synapse formation but not neuronal regeneration and synaptic plasticity*" December 2005.
69. Invited Speaker: 8th Biennial Congress – Asian & Oceanic Society of Regional Anesthesia and Pain Medicine – Japan. "*Anesthetics treatment blocks synapse formation but not neuronal regeneration and synaptic plasticity*" December 2005.
70. Session Chairperson (Stellate Ganglion Lecture - block 1 and 2): 8th Biennial Congress – Asian & Oceanic Society of Regional Anesthesia and Pain Medicine – Japan, Dec 2005.
71. Invited Speaker: 4th International Neuroscience Update Conference - Pakistan, Dec 2005.
72. Invited Speaker: Robarts Research Institute – London, ON. "*Synaptic plasticity underlying learning and memory: from brain to silicon chips!"* May 2006.
73. Invited Speaker: 5th Dutch Endo-Neuro-Psycho Meeting – Amsterdam, The Netherlands. *"Neuronal regeneration: from neurons, synapses to silicon chips"* June 2006.
74. Invited Plenary Speaker: International Congress of Respiratory Biology (ICRB) – Bonn, Germany. *"Neuronal and chemosensory control of breathing: lessons learned from a simple model system approach"* August 2006.
75. Invited Plenary Speaker: Center for Molecular Biosciences Innsbruck Meeting, (CMBI) – Innsbruck, Austria. *"From brain to silicon chips: the snail sets the pace"* September 2006.
76. Invited Speaker: National Research Centre (NRC) – Ottawa, Canada. *"Synaptic plasticity underlying learning and memory: from neurons to silicon chips"* March 2007.
77. Invited Killam Lecturer: Montreal Neurological Institute – Montreal, Canada. "*Synaptic Plasticity: From Neurons, Silicon Chips to Behavior"* From Brain Repair to Cyborgs: The future of brain-machine interfaces, April 2007.
78. Keynote Speaker: The Canadian Hall of Fame/Pfizer Canada Discovery Days – Calgary, Canada "From Brain Repair to Cyborgs: The future of brain-machine interfaces" Oct 2007.
79. Invited Lecturer – University of Naples Federico II – Naples, Italy. "*Short-term synaptic plasticity: Novel insights through brain-chip interfacing technologies*" Oct 2007.
80. Invited Lecturer – van Leeuwenhoek Lecture on Bioscience - Leiden University, Leiden, The Netherlands. "*Neuron-chip interfacing: A multi-disciplinary approach to understanding brain function and repair*" Nov 2007.
81. Invited Lecturer – Robarts Research Institute – London, ON. *Synaptic plasticity underlying learning & memory: from neurons to chips!* Nov 2007.
82. Keynote Speaker: 7th International Neurology Update Meeting – Aga Khan University, Karachi, Pakistan. "*Brain-chip interface: A bionic hybrid approach to nervous system repair*" Dec 26, 2007.
83. Keynote Speaker: 7th International Neurology Update Meeting – Aga Khan University, Karachi, Pakistan. "*Synaptic plasticity underlying learning & memory: from neurons to chips!*" Dec 27, 2007.
84. Invited Speaker: Science Café – Calgary, AB. "*Strokes and Brain Injuries to Cyborgs: marrying the mind to the machine to enhance recovery*." February 2008.
85. Invited Speaker: Alberta Ingenuity Fund, Calgary, AB. "*Neuron-chip Interfacing: The future of brain controlled prosthetic devices*". February 2008.
86. Invited Speaker: BME Seminar Series, Calgary, AB. "*Neuron-chip interfacing: A multi-disciplinary approach to understanding brain function and repair*". February 2008.
87. Invited Guest Lecturer – Organismal Biology Program, University of Calgary, Calgary, AB. "*From Brain Repair to Cyborgs: The future of brain-machine interfaces".* March 2008.

88. Invited Keynote Speaker – Institute of Biological Sciences, University of Punjab, Lahore, Pakistan. *"Brain-machine interfaces: the future of prosthetic devices".* May 2008
89. Invited Speaker – Punjawani Institute of Molecular Medicine, University of Karachi, Pakistan. *"Synaptic plasticity and learning and memory".* May 2008
90. Invited Speaker – Department of Physiology, University of Karachi, Pakistan. *"Brain and Breathing: snail sets the pace".* May 2008.
91. Invited Speaker – International Center for Chemical and Biological Sciences – University of Karachi, Karachi, Pakistan. "*Neuron-chip interfacing: A multi-disciplinary approach to understanding brain function and repair".* May 2008.
92. Invited Speaker - Canadian Prairies Group of Chartered Engineers, Danish Canadian Club, Calgary, AB. *"The marriage of nerve cells and microchip technology - new hope for brain and spinal cord injuries".* June 2008.
93. Invited Lecturer – Department of Psychology, University of Calgary, Calgary, AB "*Neuron chip interfacing: from networks to behavior – snail sets the pace*". December 2008.
94. Invited Speaker – Alberta Cryobiology Meeting, Calgary, AB "*Brain on a Chip*", January 2009.
95. Invited Lecturer – Molluscan Neuroscience Meeting, Puerto Rico, "*Synaptic plasticity: from neurons to silicon chips*", February 2009.
96. Invited Speaker – Department of Clinical Neurosciences Grand Rounds, Calgary, AB "*Neuron machine interfacing: the future of brain-controlled prosthetic devices*", February 2009.
97. Invited Speaker – Sir Winston Churchill High School (Calgary Board of Education) Science Café, Calgary, AB "*Building a Bionic Person*", March 2009.
98. Invited Speaker – University of Karachi, Karachi, Pakistan. "*Brain Machine Interface*: *From six million dollar man to cyborg"* March 2009.
99. Invited Speaker – University of Gujrat, Gujrat, Pakistan. "*Interdisciplinary research and its impact on future medicine"* March 2009.
100. Invited Speaker – Quaid-I-Azam University, Islamabad, Pakistan. "*Building a bionic person*" March 2009.
101. Invited Speaker – Foundation University, Islamabad, Pakistan. "*The future of brain controlled prosthetic devices*" March 2009.
102. Invited Speaker – 2009 Visions Symposium, Toronto, ON. *"Brain Machine Interface: From six million dollar man to cyborg*", May 2009.
103. Invited Speaker – Department of Physiological Sciences, UCLA. "*Neuron Machine Interfacing*", August 2009.
104. Invited Speaker – UCVM Frontiers in Veterinary Medicine, Calgary, AB. "*Brain-chip Interfacing: From neurons to prosthetic devices*", October 2009.
105. Keynote Speaker – International Conference on Psychology Sciences and Applications, Al Ain, UAE "*Antidepressant Fluoxetine suppresses neuronal growth and synapse formation: lessons learned from brain-chip interfacing*", March 2010.
106. Invited Speaker – International Conference on Psychology Sciences and Applications, Al Ain, UAE "*Trophic factor induced intracellular oscillations are required for the expression of postsynaptic acetylcholine receptors during synapse formation between Lymnaea neurons*", March 2010.
107. Keynote Speaker – Canadian Undergraduate Technology Conference 2010 (CUTC), Toronto, ON "*Brain Machine Interface: from six million dollar man to cyborg*", April 2010.
108. Invited Speaker – iCORE/ISIS Big Data Event, University of Calgary, Calgary, AB. "The Future of Medical Informatics", May 2010.
109. Invited Speaker – Brighton University, Brighton, UK. *"Synaptic plasticity: from neurons, silicon chips to behaviour",* July 2010.
110. Invited Speaker – Frontier Medical College, Abbottabad, Pakistan. "*Neuron-chip interfacing: a multiple disciplinary approach to understanding brain function and repair*", October 2010.

111. Invited Speaker – Fatima Jinnah Medical College, Lahore, Pakistan. "*Neuron-chip interfacing: a multiple disciplinary approach to understanding brain function and repair*", October 2010.
112. Invited Speaker – Dept. Medicine Research Rounds, Calgary, AB. *"Brain on a chip"*, October 2010.
113. Invited Speaker – Telus World of Science Lecture Series, Calgary, AB. "*Lasers and brain chips: The future of brain research*", May 2010.
114. Invited Speaker – McGill University, Montreal, Canada. "*Synapses and synaptic plasticity: From trophic molecules to silicon chips*", May 2011.
115. Invited Speaker – Markin USRP Seminar Series, University of Calgary, Calgary, AB. "*Synaptic plasticity: from neurons to silicon chips", June 2011.*
116. Invited Keynote Speaker – XVIIIth Meeting of the International Society for Arterial Chemoreception (ISAC), McMaster University, Hamilton, ON. *"Hypoxia sensing and respiratory control in the pond snail Lymnaea stagnalis". July, 2011.*
117. Invited Speaker – Queen's University, Kingston, Canada. *"Synaptogenesis: from trophic factors to neuron-chip interfacing*", January, 2012.
118. Invited Keynote Speaker – University of Calgary Society of Young Researchers (UCSYR) and the Society for Science Presentations, Elocution and the Accumulation of Knowledge (SSPEAK) Conference, Calgary, AB. *"Brain machine interface: from six million dollar man to cyborg"*, January 2012.
119. Invited Lecturer – 4th International Conference on Drug Discovery & Therapy (ICDDT), Dubai, UAE. "*Novel brain-chip technology provides breakthrough for high to med-throughput drug screening of neuronal and cardiac cells"*, February, 2012.
120. Invited Lecturer – GEMS Wellington Academy, Dubai, UAE. *"Synaptic plasticity: from neurons to silicon chips"*, February, 2012.
121. Invited Keynote Speaker – Almadina Language Charter Academy, Calgary, AB. *"Brain Machine Interface: from six million dollar man to cyborg",* March, 2012.
122. Invited Keynote Speaker – Canadian Undergraduate Technology Conference (CUTC) 2012, Calgary, AB. "*Brain on a Chip",* April, 2012.
123. Invited Keynote Speaker – 6th International Conference on Bioinformatics & Biomedical Engineering, Shanghai, China. *"Novel brain technology allows noninvasive recordings of neuronal ion channels and synaptic activity"*, May, 2012.
124. Invited Keynote Speaker – Third Military Medical University, Chonqing, China. *"Brain on a Chip"*, May, 2012.
125. Invited Speaker – University of Saskatchewan, Saskatoon, Sk. "Trophic factor induced synaptic formation and synaptic plasticity: from growth cones to neuro-chips". June, 2012.
126. Invited Speaker – Brighton University, Brighton, UK. "*Synaptic plasticity: from neurons to silicon chips",* July, 2012.
127. Chairman, Calgary Unity Conference, Calgary, AB. *"United We Stand a Chance or Face Extinction",* September, 2012.
128. Invited Lecturer – 10th International Drug Discovery Science & Technology conference, Nanjing, China. "*Novel brain-chip technology provides breakthrough for high to med-throughput drug screening of neuronal and cardiac cells"*, November, 2012.
129. Invited Speaker – University of Illinois at Urbana, Champaign, IL "*From Synaptic Plasticity to Behaviour: Brain-chip interfacing technology and modern Neuroscience"*, March 2013.
130. Invited Speaker – University of Leicester, UK. "*Neuron-to-behaviour: the future of brain-machine interfacing technologies*", December, 2013.
131. Invited Speaker – 6th International Conference on Drug Discovery and Therapy (ICDDT), Dubai, UAE. "*Novel brain-chip technology provides breakthrough for high to mid-throughput drug screening of neuronal and cardiac cells*", February, 2014.

132. Invited Speaker – Undergraduate Neuroscience Research Night - University of Calgary, Calgary, AB. *From Neurons to Computer Chips: Here Lies the Holy Grail of Neuroscience,* November 2014.
133. Invited Keynote Speaker, IMI North American Young Leaders' Conference, Orlando, FL. *"Academic Leadership: Climbing the Ladder of Success",* December 2014.
134. Invited Speaker – Clinical Rounds, Dept. Anesthesiology, Alberta Children's Hospital - Calgary, AB. *"Acute inhalation anesthetic exposure renders developing cortical neuronal circuits dysfunctional*", April, 2015.
135. Invited Keynote Speaker – IMI International Conference, Iran. "*Novel brain chip technologies and the future of neuroprosthesis"* August, 2015.
136. Invited Speaker – Science Gate - Louis Riel School, Calgary, AB. *"Brain on a chip"*, December 2015.
137. Invited Speaker – Career Day - Robert Thirsk High School, Calgary, AB. *"Brain machine interface: from six million dollar man to cyborg"*, February 2016.
138. Invited Speaker – Healthy Outcomes Research Rounds - Alberta Children's Hospital, Calgary, AB. "*From pain, brain to neurochip: the future of modern medicine"*, May 2016.
139. Invited Keynote Speaker - Aga Khan Special Lecture Series, Aga Khan University, Karachi, Pakistan. "*Brain machine hybrids: exploring new frontiers*", September 2016.
140. Invited Speaker - Canadian Pediatric Anesthesia Society Conference, Banff, AB. *"Neurotoxicity: from bench to bedside"*, October 2016.
141. Invited Speaker - Alberta Medical Association: Provincial Anesthesia Zones Meeting, Red Deer, AB. *"General anesthetics and cytotoxicity: possible implications for brain health"*, November 2016.
142. Invited Speaker - Second Binational Meeting Canada-Mexico: Channelomics = Ion Channels from Gene to connectome, Aguascalientes, Mexico. *"Calcium channels and synaptogenesis in a model system"*, November 2016.
143. Keynote Speaker - Canada Pakistan Business Council, Toronto, ON. *"Bionic Man Technology Now a Reality: Dr. Naweed Syed explains his Discovery"*, January 2017.
144. Keynote Speaker, Pakistan Neuroscience Society Meeting, 2017
145. Bicentennial Memorial Keynote Lecture, Sir Syed Ahmed Khan. Sir Syed University, Karachi, Pakistan, 2017
146. Invited Lecture, Lahore University of Management Science, 2017
147. Invited Keynote Lecture, Al-Zehra Academy, 2017
148. Invited Lecture, Al-Murtaza School, Karachi, Pakistan
149. Keynote Lecture, Canada-India Psychiatry Society, Ottawa, 2017
150. Invited Guest Lecture Shah Wilayat Trust, Karachi, Pakistan, 2017
151. Invited Keynote Lecture, University of Karachi, 2017
152. Invited Keynote Lecture, Pakistan Neuroscience Conference, Aga Khan University
153. Invited Guest Speaker, Canadian Club of Calgary, 2017
154. Invited Keynote Lecture, Calgary Youth Science Fair, 2018
155. Invited Keynote Speaker, Bridging the Gap: Neuroscience Conference, HEJ, Karachi, Pakistan, 2018
156. Invited Keynote Summer Student Research Symposium, Alberta Children's Hospital Research Institute, 2018
157. Invited Keynote speaker Summer Student Research Symposium, Vet Med, University of Calgary, 2018
158. Distinguished Speaker; Excellence in Neonatology, Cross Canada Lecture Series, 2018
159. Invited Judge, Falling Walls Lab UCalgary Finals, University of Calgary, 2018
160. Invited Speaker, UMA Conference, Dearborn MI, 2018
161. Keynote Lecture. Excellence In Neonatology: Cross Canada Lecture Series (Neonatal Innovation and Clinical Understanding). 2018

162. Keynote Speaker, Faculty of Veterinary Medicine Sure Research Day, University of Calgary, 2018
163. Invited Speaker, NICU Cross Canada Rounds, University of Calgary, 2018
164. Keynote Speaker, 17th Annual COPO (Canadians of Pakistani Origin) Gala, Markham Stouffeville Hospital, 2019
165. Keynote Speaker, National Incubation Centre and Team-up, Islamabad, Pakistan, 2019
166. Keynote Speaker, Fundraiser for the Uswa Career Planning Cell (UCPC), a subsidiary or Jabir Bin Hayyan Trust, Pakistan, 2019
167. Invited Speaker, Vision Talks, Schulich School of Engineering, University of Calgary, 2019
168. Invited Speaker, Digital Health Canada/ANHIX Calgary Winter Conference, 2019
169. Keynote Speaker, Seminar on Inspiring Innovation, Department of Physics, Allama Iqbal Open University, Islamabad, Pakistan, 2019
170. Guest Lecturer, Imamia Medics International House, Karachi, Pakistan, 2019
171. Keynote Speaker, Uswa College, Islamabad, Pakistan, 2019
172. Invited Speaker, From Development to Neurodegeneration, Aga Khan University, Pakistan, 2019
173. Invited Speaker, Festival of Faiths, Kentucky, USA, 2019
174. COMSTech Distinguished Lecture, Islamabad, Pakistan
175. Keynote Lecture: 13th SAARC-AA Society of Anesthesiologists, Lahore, Pakistan, 2019
176. Keynote Grand Lecture; University of Health Sciences, Lahore, Pakistan, 2019

X. PUBLICATIONS/PRESENTATIONS

i) PEER REVIEWED MANUSCRIPTS

1. **Syed, N.I.** and Winlow, W. Morphology and electrophysiology of neurons innervating the ciliated epithelium in *Lymnaea stagnalis* (L.). Comp. Biochem. Physiol. 93A:633-644, 1989.

2. Kyriakides, M., McCrohan, C.R., Slade, C.T., **Syed, N.I.** and Winlow, W. The morphology and electrophysiology of the neurones of the paired pedal ganglia of *Lymnaea stagnalis* (L.). Comp. Biochem. Physiol. 93A:861-876, 1989.

3. **Syed, N.I.**, Bulloch, A.G.M. and Lukowiak, K. *In vitro* reconstruction of the respiratory central pattern generator (CPG) of the mollusk *Lymnaea*. Science 250:282-285, 1990.

4. Ridgway, R.L., **Syed, N.I.**, Lukowiak, K. and Bulloch, A.G.M. Nerve growth factor (NGF) induces sprouting of specific neurons of the snail, *Lymnaea stagnalis*. J. Neurobiol. 22(4):377-390, 1991.

5. **Syed, N.I.** and Winlow, W. Co-ordination of locomotion and cardiorespiratory networks of *Lymnaea stagnalis* by a pair of identified interneurons. J. Exp. Biol. 158:37-62, 1991.

6. **Syed, N.I.**, Harrison, D. and Winlow, W. Respiratory behavior in the pond snail *Lymnaea stagnalis*. I. Behavioral analysis and relevant motor neurons. J. Comp. Physiol. 169:541-555, 1991.

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v) NON-REFEREED COMMUNICATIONS

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