CURRICULUM VITAE

GARRY P. NOLAN, Ph.D.

EDUCATION

UNDERGRADUATE SCHOOL

1979-1983 **Cornell University**
B.S., Biology, specialization in Genetics
Research: Rhizobium/Legume Microbial Genetics, Advisor: Professor Aladar Szalay

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GRADUATE SCHOOL

1983-1989 **Scientific Advisor: Professor Leonard Herzenberg Ph.D.,**

Department of Genetics, Stanford University

- **Research: Immunogenetics, Individual Cell Gene Expression**
- **Thesis: *Individual cell gene regulation studies and in situ detection of transcriptionally-active chromatin using fluorescence-activated cell sorting with a viable cell fluorogenic assay***

1989-1990 **Continuing Post-Graduate Research:**
Epigenetics of Mammalian Gene Expression;
Whole Animal Cell Sorting.

POSTDOCTORAL WORK

1990-1993 **Scientific Advisor: Professor David Baltimore**

Postdoctoral Fellow

- **NIH Fellowship Program**
- **Leukemia Society Special Fellow**

Research conducted at:

- **Whitehead Institute for Biomedical Research (MIT)**
- **Rockefeller University**

Research:

- **The NF-κB/IκB proteins (cloning and characterization of p65/RelA).**
- **Development of 293T based retroviral packaging and delivery systems**

FACULTY POSITIONS

2011-present Rachford and Carlota A. Harris Professor
Department of Microbiology and Immunology, Stanford University School of Medicine

2009-present Professor (Tenure)
Department of Microbiology and Immunology, Stanford University School of Medicine

1999-2009 Associate Professor (Tenure)
Department of Molecular Pharmacology, Stanford University School of Medicine

1995- 1999 Assistant Professor, Joint Appointment
Department of Microbiology and Immunology, Stanford University School of Medicine

1993-1999 Assistant Professor
Department of Molecular Pharmacology, Stanford University School of Medicine

OVERVIEW:

Dr. Nolan is the Rachford and Carlota A. Harris Professor in the Department of Microbiology and Immunology at Stanford University School of Medicine. He trained with Leonard Herzenberg (for his Ph.D.) and Nobelist Dr. David Baltimore (for postdoctoral work for the first cloning/characterization of NF-□B p65/RelA and the development of rapid retroviral production systems). He has published over 180 research papers, is the holder of 17 US patents, and has been honored as one of the top 25 inventors at Stanford University.

Dr. Nolan is the first recipient of the Teal Innovator Award (2012) from the Department of Defense (a $3.3 million grant for advanced studies in ovarian cancer), the first recipient of an FDA BAAA to an academic institution ($3 million for "Bio-agent protection" grant from the FDA for a "Cross-Species Immune System Reference"), received the award for "Outstanding Research Achievement in 2011" from the Nature Publishing Group for his development of CyTOF applications in the immune system, Elected as a Fellows of the American Institute for Medical and Biological Engineering, and is the recipient of the Ernest Cotlove Award from the Academy of Clinical Laboratory Physicians & Scientists.

Dr. Nolan is an outspoken proponent of translating public & private investment in basic research to serve the public welfare. Dr. Nolan was the founder of Rigel Inc. (NASDAQ: RIGL), and Nodality, Inc., a diagnostics development company and serves on the Boards of Directors of several companies, as well as consults for other biotechnology companies. DVS Sciences, on which he is Chair of the Scientific Advisory Board, was recently sold (link) underscoring the considerable interest in the technology in academic and clinical venues.

Dr. Nolan's areas of research include hematopoiesis, cancer and leukemia, autoimmunity and inflammation, and computational approaches for network and systems immunology. His most recent efforts are focused on a single cell analysis advance using a mass spectrometry-flow cytometry hybrid device, the so-call "CyTOF". The approach uses an advanced ion plasma source to determine the levels of tagged reagents bound to cells—enabling a vast increase in the number of parameters that can be measured per cell. Another recent innovation is termed molecular ion beam imaging (MIBI) a system that also uses mass tags that will enable sub-light imaging (5 nm resolution) of tissue sections with 50 or more parameters per image. His laboratory has already begun a large scale mapping of the hematopoietic hierarchy in healthy human bone marrow at an unprecedented level of detail. Dr. Nolan's efforts are to enable a deeper understanding not only of normal immune function, trauma, and other inflammatory events but also detailed substructures of leukemias and solid cancers—which will enable wholly new understandings that will enable better management of disease and clinical outcomes.

HONORS AND FELLOWSHIPS

National Science Foundation Fellowship. Organization and Function of the Eukaryotic Genome. Spetsai, Greece. September 1988.

Awarded American Cancer Society Fellowship (declined).

National Institutes of Health Fellowship: June 1990-June 1992.

Leukemia Society Special Fellow: July 1992-June 1995.

Leukemia Society Scholar Award: July 1995-June 2000.

Hume Faculty Scholar: 1993-1998

Board of Trustees, Leukemia Society of America, Northern California: 1995-1998.

1996 Burroughs Wellcome Fund New Investigator Award: July 1996 - June 2000.

Stanford University: Howard Hughes Medical Institute Junior Faculty Scholar Award. May 1997 - April 1998.

Leukemia and Lymphoma Society: Stohlman Scholar. January 2000 – December 2000.

Nature Publishing Group "Outstanding Research Achievement for 2011" for Mass Cytometry and CyTOF.

Department of Defense Teal Innovator Award, 2012.

Elected as a Fellow of the American Institute for Medical and Biological Engineering, 2014 (induction in 2015).

Cotlove Award, Academy of Clinical Laboratory Physicians & Scientists (2015).

NIH BOARDS

Co-Chair, trans-NIH Roadmap Initiative on Cellular Signatures.

National Heart, Lung, and Blood Institute Board of External Experts.

NCI-Frederick Advisory Committee.

NATIONAL SOCIETIES

American Association for the Advancement of Science

American Society for Microbiology

American Association of Immunologists

Society of Developmental Biology

American Society for Gene Therapy

EDITORIAL BOARDS

Chemistry and Biology (1997-1999)

Genes to Cells

Molecular Systems Biology

Gene Therapy & Molecular Biology

Molecular Therapy (American Cancer Society)

Open Network Biology

TEACHING

1983	Teaching Assistant: "Medical Genetics", Stanford University School of Medicine
1988	Instructor/Lecturer: EMBO Course "Flow Cytometry and Sorting in Molecular Biology", Cologne, Germany
1989	Instructor/Lecturer: International Becton Dickinson Immunocytometry Series. Applications of Flow Cytometry to Molecular Biology
1993-1998	Instructor/Lecturer: Medical Pharmacology, Advanced Immunology, Stanford University School of Medicine
1994	Instructor/Course Director: Advanced Immunology, Stanford University School of Medicine
1994-1996	Lecturer: Antimicrobiology and Antiviral Therapy, Stanford University School of Medicine
1996	Lecturer: Virology, Stanford University School of Medicine
1998	Instructor/Course Director: Gene Therapy, Stanford University School of Medicine
2000	Instructor/Course Director: Gene Therapy, Stanford University School of Medicine
2001	Instructor/Course Director: Gene Therapy, Stanford University School of Medicine
2002	Instructor/Course Director: Stem Cells & Gene Therapy, Stanford University
2003	Instructor/Course Director: Stem Cells & Gene Therapy, Stanford University
2006	Instructor/Course Director: NIH Sponsored Phospho-Flow signaling course
2007	Instructor/Course Director: NIH Sponsored Phospho-Flow signaling course
2008	Instructor/Course Director: NIH Sponsored Phospho-Flow signaling course
2009	Instructor/Course Director: NIH Sponsored Phospho-Flow signaling course
2010	Instructor/Course Director: NIH Sponsored Phospho-Flow signaling / Immune Monitoring course
2011	Instructor/Course Director: NIH Sponsored Phospho-Flow signaling / Immune Monitoring course
2012	Instructor/Course Director: NIH Sponsored Phospho-Flow signaling / Immune Monitoring course

INVITED SPEAKER (SELECTED LIST)

1988 University of Koln, EMBO Flow Cytometry Course, Koln
1988 Institut Pasteur, Unite de Biologie Moleculaire du Development, Paris
1988 Karolinska Institutet, Department of Tumour Biology, Stockholm
1989 Becton Dickinson Immunocytometry Systems, San Francisco
1989 7th International Congress of Immunology, Workshop, Berlin
1989 Genentech, Division of Molecular Biology, South San Francisco
1990 Genentech, Flow Cytometry Meeting, South San Francisco
1991 RIKEN Frontier Research Program, Tsukuba, Japan
1991 Tokyo University, Institute of Medicine, Japan
1991 Osaka University, Department of Molecular Biology, Japan
1992 Kyoto University, Japan
1993 Systemix, Palo Alto, CA
1993 DNAX, Palo Alto, CA
1994 Tularik, Inc., South San Francisco
1994 Leukemia Society Mtg., Dublin, Ireland
1995 Roche, Inc., Palo Alto, CA
1995 University of Michigan, Ann Arbor, MI
1995 Pfizer, Inc., Groton, CT
1996 Chiron
1996 Applied Immune Science
1996 UC Irvine
1996 Cornell Medical Center
1996 Columbia Medical Center
1996 MIT
1996 Harvard School of Public Health
1996 UCSF Grand Rounds
1996 The Burnham Institute, La Jolla, CA
1997 Amgen Institute, Toronto, Ontario. Canada
1997 Harvard University, Dept. of Cell Biology
1997 MIT, Dept. of Biology and Whitehead Institute
1998 Amgen Institute, Thousand Oaks, CA
1998 Amgen Institute, Toronto, Ontario, CA
1998 Genentech, South San Francisco, CA
1998 UCSF, Immunology Program, CA
1998 University of Michigan, HHMI, Ann Arbor, MI
1998 Merck & Co., Inc. West Point, PA
1999 Amgen Institute, Toronto, Ontario, Canada
1999 Novartis Pharmaceuticals, New Jersey

1999 Yale University
1999 University of Rochester, New York
1999 University of Pennsylvania
1999 University of California, San Diego
2000 Weizmann Institute, Visiting Scholar Program, Academic Year 2000
2000 Duke University, North Carolina
2000 University of Texas Southwestern, Texas
2000 Cold Spring Harbor Laboratory, New York
2001 New York Academy of Sciences, New York
2002 University of California, Berkeley
2002 Cold Spring Harbor Laboratory, New York
2002 American Biological Safety Association, San Francisco
2003 ICOS Corporation, Bothell, WA
2003 Fox Chase Cancer Center, Philadelphia, PA
2003 EMBO Course, Deutsches Rheuma-Forschungszentrum Berlin (DRFZ), Germany
2003 Boehringer Ingelheim Pharmaceuticals, Inc., Ridgefield, CT
2003 BD Biosciences, Denmark
2004 University of California, Berkeley
2004 Johnson and Johnson, New Brunswick, NJ
2004 University of Virginia, Charlottesville, VA
2004 UCSD, San Diego, CA
2004 Amgen, Thousand Oaks, CA
2005 University of Miami, Miami, FL
2005 University of Washington, Seattle, WA
2005 Genentech, South San Francisco, CA
2005 University of Toronto, Toronto, Canada
2005 MIT University, Cambridge, MA
2005 Harvard University, Cambridge, MA
2005 Albert Einstein, New York, NY
2005 Bristol Myers Squibb, NJ
2005 Case Western Reserve, OH. "The Greenfield Lecture"
2005 Agilent, CA
2005 Genome Canada, Montreal
2005 Williams College, MA "Distinguished Speaker"
2006 Saban Research Institute, USC, CA
2006 Scripps, San Diego, CA
2006 University of New Mexico, Albuquerque, NM
2006 UCLA, Los Angeles, CA
2007 GlaxoSmithKline, New York
2007 Seminars at Penn AFCRI, Philadelphia, PA

2007 MD Anderson, Houston, TX
2007 Memorial Sloan Kettering, New York
2007 FASEB, San Francisco
2007 Leukemia and Lymphoma Society, Anaheim. CA
2007 Columbia University, New York
2007 NIH Immunology Interest Group, Bethesda, MD
2007 Massachusetts General Hospital, Boston, MA
2007 NIH, Cancer Stem Cell Workshop, Bethesda, MD
2007 Targegen, San Diego, CA
2007 Emory University, Atlanta, GA
2008 MD Anderson, Houston, TX
2008 Georgia Tech Integrative BioSystems Institute, Atlanta, GA
2008 Eastern Cooperative Oncology Group, Ft. Lauderdale, FL
2009 Donald Wassenberg Memorial Lecture on Genetic Disease Research, San Diego CA
2009 ETH Zurich, Biosystems Science and Engineering, Basel, Switzerland
2010 UCLA, Los Angeles, CA
2010 Genentech, South San Francisco, CA
2010 Affymetrix, Santa Clara, CA
2011 Gilead, Foster City, CA
2011 St. Jude Children's Research Hospital, Memphis, TN
2011 University of Virginia, Charlottesville, VA
2011 Vancouver BC Cancer Agency, Vancouver, Canada
2011 21st Annual Conference of the German Society For Cytometry, Bonn
2011 ETH, Zurich, Switzerland
2012 Lawrence Berkeley National Laboratory, Berkeley, CA
2012 Memorial Sloan Kettering Cancer Center, New York, NY
2012 Northwestern University Physical Science of Cancer, Evanston, IL
2012 University of California, San Diego, CA
2012 AstraZeneca, Waltham, MA
2012 Novo Nordisk, Copenhagen, Denmark
2012 Max Planck Institute, Munich, Germany
2012 Miltenyi Biotec GmBH, Gladbach, Germany
2013 The Scripps Research Institute, Florida
2013 Seattle Genetics, Seattle, WA
2013 Cell Signaling Technology, Danvers, MA
2013 Pfizer Inc., Groton, CT
2013 Thermo Fisher Scientific, Waltham, MA
2013 Merck Research Labs, Boston, MA
2013 Washington University, St. Louis, MO
2013 Novartis, Basel, Switzerland

2013 Karolinska Institute, Stockholm, Sweden
2013 Department of Microbiology & Immunology, Columbia University, New York, NY
2013 Vanderbilt University, Nashville, TN
2014 Harvard Medical School, Boston Children's Hospital, Boston, MA
2014 Harvard Medical School, Mass General Hospital, Boston, MA
2014 University of Minnesota, Minneapolis, MN
2015 NIH Immunology Interest Group Seminar, Bethesda, MD
2015 Institute for Cellular and Molecular Biology at the University of Texas at Austin, TX
2015 Distinguished Lecture Series, Fox Chase Cancer Center, Philadelphia, PA
2015 Juno Therapeutics, Seattle, WA

INVITED SYMPOSIA SPEAKER (SELECTED LIST)

08/1995 Gordon Conference, Medicinal Chemistry, New Hampshire
08/1995 Gallo Lab Meeting, NIH, Bethesda, MD
09/1995 Symposia of the Society of Developmental Biology, San Diego, CA
10/1995 Transcription Meeting, Ireland
10/1995 Gene Therapy Course, Italy
10/1995 Frontiers in Gene Therapy, Vanderbilt University, Nashville, TN
04/1997 Keystone Symposia, Molecular and Cellular Biology of Gene Therapy
04/1997 EMBO Meeting: Viral Vectors in Basic Biology, Heidelberg
04/1997 NATO Advanced Study Institute on Gene Therapy. Spetsai, Greece
10/1997 The Twelfth Rinshoken International Conference, Tokyo, Japan
01/1998 Keystone Symposia, Molecular and Cellular Biology of Gene Therapy
03/1998 NIH Policy Meeting on Lentiviral Vectors, Bethesda, MD
03/1998 Keystone Symposia, HIV Pathogenesis and Treatment
04/1998 IBC Genomics and Proteomics Conference, La Jolla, Session Chair
05/1998 The American Society of Gene Therapy (Inaugural Meeting), Seattle
06/1998 Protein Genomics, CHI Conference, Session Chair, Boston
07/1998 Int'l Centre for Genetic Engineering and Biotechnology, Lecture Course, Udine, Italy
10/1998 Int'l Symposia on Protein Interaction Technologies, San Francisco
11/1998 Sixth Meeting of the European Working Group on Human Gene Transfer and Therapy, Israel
01/1999 Keystone Symposia, Molecular and Cellular Biology of Gene Therapy
02/1999 American Academy of Allergy, Asthma and Immunology, Orlando, FL
06/1999 The American Society of Gene Therapy, 2nd Annual Meeting, Washington, DC
07/1999 NIH, National Heart, Lung and Blood Institute Workshop
08/1999 Turku BioCity Symposium, Turku, Finland
01/2000 Keystone Symposia, Gene Therapy: The Next Millennium
04/2000 Cambridge Health Institute 2nd Annual Protein Discovery Technologies
05/2000 amfAR/TAG conference

05/2000 American Society for Gene Therapy 3rd Annual Meeting, Denver, CO
08/2000 IBC 5th International Conference Biomolecular Diversity, Waltham, MA
10/2000 Leukemia & Lymphoma Society Stohlman Scholar Symposia, Indianapolis, IN
01/2001 AMSMIC Annual Conference
05/2001 American Society for Gene Therapy 4th Annual Meeting, Seattle, WA
08/2001 Gene Therapy & Molecular Biology International Conference 2001, Corfu, Greece
10/2002 American Biological Safety Association 45th Biological Safety Conference, San Francisco, CA
11/2002 The Leukemia & Lymphoma Society's N. California Div. Scientific Symposium, Oakland, CA
12/2002 IBC's Cell-Based Assays & Screening, Philadelphia, PA
02/2003 Leukemia & Lymphoma Soc., Application of Gene Therapy to Leukemia and Lymphoma, Miami, FL
03/2003 Keystone Symposia, Molecular Targets for Cancer Therapy, Banff, Canada
03/2003 IBC, Protein Discovery and Engineering, San Francisco, CA
05/2003 FOCIS 3rd Annual Meeting, Paris, France
06/2003 IBC's 2nd Cell Based Assay and Screening Symposium, San Francisco, CA
09/2003 6th Conference on Protein Expression in Animal Cells, Mont-Tremblant, Canada
11/2003 AACR-NCI-EORTC International Conference, Boston, MA
02/2004 GRC Peptides Chemistry and Biology, Ventura, CA
03/2004 AACR 95th Annual Meeting, Orlando, FL
06/2004 CHI Beyond Genome: Proteomics, San Francisco, CA
07/2004 FOCIS 4th Annual & 12th International Congress of Immunology Meeting, Montreal, Canada
09/2004 13th Conference of the International Society of Differentiation, Honolulu, HI
10/2004 NIAID/NIH - Twinbrook Seminar Series, Rockville, MD
12/2004 University of Helsinki, Helsinki, Finland
01/2005 NIH, Standard in Proteomics workshop, Bethesda, MD
02/2005 Keystone Symposia, The Role of Microenvironment in Tumor Induction and Progression, Banff, Canada
03/2005 IBC USA Conferences, ScreenTech & TargetTalk conference, San Diego, CA
03/2005 Novartis Pharma, Basel, Switzerland
03/2005 Jahnsenn, Brusells, Austria
03/2005 Lilly Systems Biology Pte. Ltd, Singapore
05/2005 BCCR 6th Conference on Cancer Research 2005, Bergen, Norway
06/2005 Serono Conference, Philadelphia, PA
10/2005 University of Chicago, Proteomics Symposia, IL
10/2005 Stem Cells and Hematopoietic Tumors, Germany
11/2005 Shanghai, China, Systems Biology
12/2005 Opening Speaker, ASCB Plenary talk, San Francisco, CA
02/2006 Keystone, Vancouver, Signaling Networks
02/2006 Targeted Therapies in Leukemia, Portugal
02/2006 Keystone, Santa Fe, Cancer and Kinases
02/2006 Cambridge Health, Plenary, Molecular Diagnostics, San Francisco
02/2006 Keynote Speaker, Royal Society of Pathology, Sydney

05/2006 Opening Speaker, International Society of Analytic Cytometry, ISAC, Quebec
11/2006 Nature Chemical Biology Symposium
12/2006 ASH, Orlando, FL
03/2007 Cooperative USA/Japan Cancer, Hawaii
04/2007 AACR, Philadelphia, PA
06/2007 EHA, Vienna
02/2008 NIH Nanotechnology Workshop, Bethesda, MD
03/2008 Frontiers of Cancer Nanotechnology, Atlanta, GA
05/2008 ICBP 2nd Data Integration Workshop, San Francisco
05/2008 EU-NCI (USA) Conference, Genval, Belgium
05/2008 CNIO, Madrid
07/2008 Breast Cancer Congress, Hawaii
09/2008 NCI Nanotechnology Alliance Investigators Meeting, Chicago
09/2008 MMHCC/NIH Symposium, Boston
09/2008 AACR Int'l Conf. on Molecular Diagnostics in Cancer Therapeutic Development, Philadelphia
01/2009 "Omics meets cell Biology" Keystone. Symposia Plenary Speaker.
02/2009 Keynote Speaker, Cancer Profiling and Pathways, Moscone Center, San Francisco.
05/2010 ISAC, Emergent Technologies and Engineering Innovations Showcase, Seattle
07/2010 Allen Institute Workshop on Reverse Engineering Cell Networks, Seattle
08/2010 14th International Congress of Immunology, Kobe, Japan
10/2010 ITI Symposium on New Technologies in Immune Phenotyping, Stanford
11/2010 Keynote Speaker, Flow Informatics and Computational Cytometry, Seattle, WA
12/2010 Uppsala Universitet, Sweden
04/2011 La Jolla Institute for Allergy and Immunology, La Jolla, CA
04/2011 AACR 102nd Annual Meeting, Orlando, FL
05/2011 Stanford Immunology Seminar, Stanford, CA
06/2011 World Pharma Congress, Philadelphia, PA
06/2011 45th Joint (US – Japan) Working Conference on Immunology, Stanford, CA
06/2011 Internal Medicine Grand Rounds, Stanford, CA
10/2011 Broad, Single Cell Approaches to Host Immunity and Microbes, Cambridge, MA
10/2011 MSKCC, "Systems Biology of Diversity in Cancer" Symposium, New York, NY
10/2011 EMBL, Structure and Dynamics of Protein Networks, Heidelberg, Germany
10/2011 1st International SystemsX.ch Conference on Systems Biology, Basel, Switzerland
01/2012 Lawrence Berkeley National Laboratory, Berkeley, CA
02/2012 Keystone Symposia - Technological Innovation Driving More Highly Accurate Models of Disease
03/2012 19th Conference on Retroviruses and Opportunistic Infections, Seattle, WA
03/2012 Keystone Symposia Regulation of Lymphocyte Signaling 2012
03/2012 U.S. Human Proteome Organization (US HUPO), San Francisco, CA
03/2012 Northwestern University Physical Sciences Oncology Center, Evanston, IL
03/2012 BioMedicine in 4D Conference, Portland, OR

04/2012 NIH Common Fund Single Cell Analysis Workshop, Bethesda, MD
04/2012 NYU School of Medicine - Honors Program Lecture Series, New York, NY
04/2012 Center for Cancer Systems Biology, Stanford, CA
05/2012 Integrative Network Biology 2012, Snekkersten, Denmark
05/2012 Max Planck Institute, Munich, Germany
06/2012 ISAC, CYTO 2012, Leipzig, Germany
07/2012 European Proteomics Association, Glasgow, Scotland
08/2012 Clinical Biomarkers & New Frontiers in Cancer Summit, San Francisco, CA
09/2012 European Congress of Immunology 2012, Glasgow, Scotland
09/2012 From the Laboratory to the Clinic, Trinity College, Oxford, England
10/2012 Society for Immunotherapy of Cancer, Bethesda, MD
11/2012 World Genome Data Analysis Summit, San Francisco, CA
01/2013 Society for Laboratory Automation and Screening, Orlando, FL
01/2013 CellTech 2013, San Diego, CA
02/2013 Personalized Medicine World Congress, Mountain View, CA
03/2013 Affinity Proteomics, Alpbach, Austria
03/2013 DRFZ 9th Spring School, Ettal, Germany
03/2013 Max Planck Institute, Berlin, Germany
03/2013 "LINCS" Data Forum, Harvard, Cambridge, MA
04/2013 Animal Models and Beyond, Frederick National Laboratory for Cancer Research, Frederick, MD
05/2013 International Society for Laboratory Hematology, Toronto, Canada
07/2013 Molecular Mechanisms of Lymphocyte Development and Function, FASEB Conference, Colorado
07/2013 Physical Biology of Stem Cells, Cambridge Stem Cell Institute, Cambridge, UK
09/2013 Mass Cytometry and Cell Cycle, Mexico City, Mexico (by WebEx)
09/2013 Nuclear Reprogramming and the Cancer Genome, Nature & Ludwig Institute, Oxford, UK
10/2013 Multiparameter Mass Cytometry (MMC) and analysis tools, INSERM, Paris, France
10/2013 ACR/ARHP Annual Meeting, San Diego, CA
11/2013 8th Cell Based Assay & Screening Technologies Conference, San Francisco, CA
12/2013 Inaugural NCI Current Topics in Cancer Systems Biology Meeting, Nashville, TN
01/2014 Next-generation synthetic lethal screens for KRAS cancers, NCI, Frederick, MD
02/2014 Molecular Medicine Tri-Conference, San Francisco, CA
02/2014 New Technologies Applicable to Study of T-cell lymphomas, San Diego, CA
02/2014 Single Cell Symposia, University of Pennsylvania, Philadelphia, PA
03/2014 American Association of Cancer Researchers (AACR), San Diego, CA
03/2014 Keynote, Translational Research and Applied Medicine Program, Stanford, CA
05/2014 Cotlove Award Lecture, Academy of Clinical Laboratory Physicians & Scientists, San Francisco, CA
05/2014 Keynote Speaker, TRAM Symposia and Retreat, Stanford, CA
06/2014 Keynote, MCMi Regulatory Science Symposium, Silver Spring, MD
06/2014 Fluidigm Symposium, Tokyo, Japan
06/2014 Dana Farber Cancer Center, Boston, MA

06/2014 Nature Conference - Genomic Technologies & Biomaterials for Understanding Disease, San Diego, CA
09/2014 The Immune System and Cancer, Banbury Center of Cold Spring Harbor Laboratory, NY
09/2014 Translating Imaging and Other Novel Approaches, Trinity College, Oxford, UK
10/2014 Science Day at MedImmune, Mountain View, CA
10/2014 "Intra-Patient Tumor Heterogeneities: Implications for Targeted Therapy" Stanford Cancer institute
10/2014 Bill and Melinda Gates Foundation - 2014 Grand Challenges Meeting, Seattle, WA
11/2014 International Society for Computational Biology, San Diego
12/2014 Department of Defense OCRP Programmatic Review, Baltimore, MD
01/2015 Google Stand Up to Cancer (SU2C), Mountain View, CA
01/2015 Stanford Medicine Leadership Retreat, Sausalito, CA
02/2015 AACR: Translation of the Cancer Genome, Cancer Computational & Systems Biology, San Francisco, CA
03/2015 American Institute for Medical and Biological Engineering, Washington, DC
04/2015 Institute for Cellular & Molecular Biology, University of Texas, Austin, TX
05/2015 Immunology Forum Seminar, Johns Hopkins School of Medicine, Baltimore, MD
05/2015 Interrogating Complex Biological Systems Symposium, Johns Hopkins Medicine, Baltimore, MD
06/2015 14th Annual Koch Institute Cancer Research Symposium, MIT, Cambridge, MA
06/2015 Cold Spring Harbor Labs "Single Cell Analysis Course", Cold Spring Harbor, NY
06/2015 Plenary Speaker, FOCIS 2015, San Diego, CA
07/2015 SU2C - Google[x] Technology and Analysis Satellite Meeting, Boston, MA
07/2015 Protein Society 29th Annual Symposium, Barcelona, Spain
09/2015 Tisch Cancer Institute "Frontiers in Oncology" Lecture, New York, NY
09/2015 Second Edition Systems Biology of Infection Symposium, Zurich, Switzerland
09/2015 University of California San Francisco Human Immunology, San Francisco, CA
09/2015 Seminar, Baylor, TX
09/2015 Sanger Institute, Cambridge, UK
09/2015 Joint CRI-CIMT-EATI-AACR Meeting, New York, NY
10/2015 Frontiers in Medicine, Stanford, CA
10/2015 DFCI-Oncology, Boston, MA
10/2015 Parker Institute for Cancer Immunotherapy, New York, NY
10/2015 Sino-US Symposium, Stanford, CA
10/2015 Fluidgm Talk, Berkley, CA
01/2016 Personalized Medicine World Conference 2016, Mountain View, CA
02/2016 Big Data to Human Immune Responses, Irvine CA
04/2016 Realize the Practical Applications of RNA-Seq, San Francisco, CA
05/2016 Harvard Annual Pathology Retreat, Boston, MA
05/2016 The American Association of Immunologists, Seattle, WA
05/2016 Gladstone, San Francisco, CA
05/2016 Actelion Pharmaceuticals Ltd, Allschwil, Switzerland
06/2016 Changing Views in Cancer, Charité, Berlin
06/2016 TxSACT, Houston, TX

07/2016 GRC, Hong Kong, China
07/2016 SATU Sympoisum, Taiwan, R.O.C.
07/2016 Institue of Molecular Biology Academia Sinica, Sinica, Taipei
09/2016 EarthRise at IONS, Petaluma, CA
09/2016 Stanford Immunology Scientific Conference, Stanford, CA
09/2016 AMGEN, San Francisco, CA
09/2016 Animal Model Development Workshop, Bethesda, MA
09/2016 MedImmune, Mountain View, CA
09/2016 Nature Conference, Seattle, WA
10/2016 Cell Symposia, Berkley, CA
10/2016 Human Cells, London, England
10/2016 AACR, Boston, MA
10/2016 University of Pennsylvinia, Philadelphia, PA
10/2016 Parker Institute Retreat, Middleburg, VA
11/2016 UCSF Pathology Department, San Francisco, CA
12/2016 17th Annual PI Meeting, Bethesda, MD
01/2017 Genome Sciences Seminar UW, Seattle, WA
01/2017 Mass Spectrometry: Applications to the Clinical Laboratory –MSACL, Palm Springs, CA
02/2017 Advances in Genome Biology and Technology – AGBT, Ft. Lauderdale, FL
02/2017 Immune Mediated Inflammatory Diseases – Wellcome, London, England

PUBLICATIONS

1. **Nolan, G.P.**, *On the Foraging Strategies of Carnivorous Plants: Protein and Movement Sensitive Tentacles of Drosera burmannii*. Carnivorous Plant Newsletter, 1978. **7**: p. 79-81.
2. Maina, C.V., **G.P. Nolan** and A.A. Szalay, *Molecular weight determination program.* Nucleic Acids Res, 1984. **12**(1 Pt 2): p. 695-702.
3. **Nolan, G.P.**, C.V. Maina and A.A. Szalay, *Plasmid mapping computer program.* Nucleic Acids Res, 1984. **12**(1 Pt 2): p. 717-729.
4. Nakauchi, H., **G.P. Nolan**, C. Hsu, H.S. Huang, P. Kavathas and L.A. Herzenberg, *Molecular cloning of Lyt-2, a membrane glycoprotein marking a subset of mouse T lymphocytes: molecular homology to its human counterpart, Leu-2/T8, and to immunoglobulin variable regions.* Proc Natl Acad Sci U S A, 1985. **82**(15): p. 5126-5130.
5. Tagawa, M., H. Nakauchi, L.A. Herzenberg and **G.P. Nolan**, *Formal proof that different-size Lyt-2 polypeptides arise from differential splicing and post-transcriptional regulation.* Proc Natl Acad Sci U S A, 1986. **83**(10): p. 3422-3426.
6. Nakauchi, H., M. Tagawa, **G.P. Nolan** and L.A. Herzenberg, *Isolation and characterization of the gene for the murine T cell differentiation antigen and immunoglobulin-related molecule, Lyt-2.* Nucleic Acids Res, 1987. **15**(10): p. 4337-4347.
7. **Nolan, G.P.**, S. Fiering, J.F. Nicolas and L.A. Herzenberg, *Fluorescence-activated cell analysis and sorting of viable mammalian cells based on beta-D-galactosidase activity after transduction of Escherichia coli lacZ.* Proc Natl Acad Sci U S A, 1988. **85**(8): p. 2603-2607.
8. Kerr, W.G., **G.P. Nolan** and L.A. Herzenberg, *In situ detection of transcriptionally active chromatin and genetic regulatory elements in individual viable mammalian cells.* Immunol Suppl, 1989. **2**: p. 74-78; discussion 79.
9. Kerr, W.G., **G.P. Nolan**, A.T. Serafini and L.A. Herzenberg, *Transcriptionally defective retroviruses containing lacZ for the in situ detection of endogenous genes and developmentally regulated chromatin.* Cold Spring Harb Symp Quant Biol, 1989. **54 Pt 2**: p. 767-776.
10. Fiering, S., J.P. Northrop, **G.P. Nolan**, P.S. Mattila, G.R. Crabtree and L.A. Herzenberg, *Single cell assay of a transcription factor reveals a threshold in transcription activated by signals emanating from the T-cell antigen receptor.* Genes Dev, 1990. **4**(10): p. 1823-1834.
11. Ghosh, S., A.M. Gifford, L.R. Riviere, P. Tempst, **G.P. Nolan** and D. Baltimore, *Cloning of the p50 DNA binding subunit of NF-kappa B: homology to rel and dorsal.* Cell, 1990. **62**(5): p. 1019-1029.
12. Yancopoulos, G.D., **G.P. Nolan**, R. Pollock, S. Prockop, S.C. Li, L.A. Herzenberg and F.W. Alt, *A novel fluorescence-based system for assaying and separating live cells according to VDJ recombinase activity.* Mol Cell Biol, 1990. **10**(4): p. 1697-1704.
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EDITED BOOKS OR CHAPTERS IN BOOKS

(B1) In Situ detection of transcriptionally-active chromatin and genetic regulatory elements in individual viable mammalian cells. William G. Kerr, Garry P. Nolan, and Leonard A. Herzenberg. (1989) Immunology. Special Conference edition, Vol. 68, supplement 2, pp 74-79.

(B2) Lymphoid VDJ recombinase activity: Development of a novel fluorescence-based assay system. George D. Yancopoulos, Garry P. Nolan, Roberta Pollock, Suzanne Li, Leonard A. Herzenberg, and Frederick W. Alt. (1989) Vectors as Tools for the Study of Normal and Abnormal Growth and Differentiation. Edited by H. Lother et al. Springer-Verlag, NATO Series, Vol H 34.

(B3) Smith, R. and Nolan, G.P. (2000) Retroviral and Lentiviral approaches for gene therapy for autoimmune disease. Current Directions in Autoimmunity, Vol. 2: Biologic and Gene Therapy of Autoimmunity, pp167-188, ed. C.G. Fathman, Stanford, Calif., S. Karger AG, Basel.

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ISSUED PATENTS

(1) Monitoring of cells and trans-activating transcription elements. Garry P. Nolan, Steven Fiering, and Leonard A. Herzenberg. United States Patent # 5,070,012. Dec. 3, 1991.

(2) Rapid, stable high-titre production of recombinant retrovirus. Todd Kinsella and Garry P. Nolan. United States patent #5,830,725. Nov. 3, 1998.

(3) Methods for screening for transdominant intracellular effector peptides and RNA molecules. Inventors: Garry Nolan and Michael Rothenberg (this patent is co-owned with Rigel). US Patent #6,153,380. Nov. 28, 2000.

(4) Methods for screening for transdominant effector peptides and RNA molecules. Inventors: Garry P. Nolan and Michael Rothenberg (this patent is co-owned with Rigel). US Patent #6,365,344. April 2, 2002.

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(7) Peptide and RNA Affinity-based Fluorophores. Garry P. Nolan and Michael Rozinov. US Patent #6,747,135. June 8, 2004.

(8) Methods for screening for transdominant intracellular effector peptides and RNA molecules. Garry P. Nolan P. US Patent #6,737,241. May 18, 2004.

(9) Methods for screening for transdominant effector peptides and RNA molecules. Garry P. Nolan and Rothenberg; S. Michael. US Patent #6,833,245. December 21, 2004.

(10) Combinatorial enzymatic complexes. Garry P. Nolan and Payan; Donald. US Patent #6,969,584. November 29, 2005.

(11) Fluorescent dye binding peptides. Garry P. Nolan., Rozinov; Michael N. US Patent #7,332,356. February 19, 2008.

(12) Methods and compositions for detecting receptor-ligand interactions in single cells. Perez; Omar D., & Garry P. Nolan. US Patent #7,381,535. June 3, 2008.

(13) Methods and compositions for risk stratification. Perez; Omar D., Garry P. Nolan, Irish; Jonathan M. US Patent #7,393,656. July 1, 2008.

(14) Methods and compositions for detecting the activation state of multiple proteins in single cells. Perez; Omar D., Garry P. Nolan US Patent #7,563,584. July 21, 2009.

(15) Perez; Omar D. (Palo Alto, CA), Nolan; Garry P. Methods and compositions for detecting receptor-ligand interactions in single cells. US Patent #7,695,924. April 13, 2010.

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(17) Perez; Omar D. (San Francisco, CA), Garry P. Nolan (San Francisco, CA), Irish; Jonathan M. Methods and compositions for risk stratification. US Patent #7,939,278. May 10, 2011.

RESEARCH

ACTIVE:

BAA-15-00121 (Nolan, G.P.) 06/01/16-05/31/2019
FDA
Sequelae and immunopathology of Ebola virus infections
To determine immunological, genetic and pathological signatures that cause sequelae after acute infection in individuals that have survived Ebola virus disease in Guinea, Liberia and the Democratic Republic of Congo.

U54 CA209971 (Plevritis, Co-PI) 08/25/16-07/31/2019
NIH
Modeling the Role of Lymph Node Metastases in Tumor-Mediated Immunosuppression. To enhanced high-dimensional, single-cell, quantitative analysis of bioactive molecules on and within cell populations with the advent of tools such as CyTOF and RNAseq.

U19 AI057229 (Davis, M.) 04/01/14-03/31/19
NIH
Program title: "Adaptive and innate immunity, memory and repertoire in vaccination and infection"
Project D PI: Nolan, G.P. Project D title: "Activation States of Immune Cells"
Major Goals of the Nolan project are to develop multiparameter flow cytometry assays to detect activated T, B, and NK cells and to adapt these assays for phenotypic and functional analysis of peripheral blood APCs.

DR1-01477 (Slamon, D.J.) 09/01/10-04/30/15
CIRM
"Therapeutic Opportunities to Target Tumor Initiating Cells in Solid Tumors"
The major goal of this subproject is to identify therapeutic targets to tumor initiating cells in solid tumors.

U54CA149145 (Plevritis, S.) 05/01/10-02/28/15
NCI
"Modeling the Role of Differentiation in Cancer Progression"
To discover molecular mechanisms underlying cancer progression by studying cancer as a complex biological system that is driven, in part, by impaired differentiation.

N01-HV-00242 (Nolan, G.P.) 08/15/10-08/14/15
NHLBI, NIH
"Proteomics of Inflammation, Immunity, and Pulmonary Arterial Hypertension"
To promote the further development of novel proteomic technologies in the context of relevant clinical settings, understand new biological principles related to the interaction(s) of PAH and immunity, and progress (and co-develop) therapeutics and diagnostics for the amelioration of PAH and related disease syndromes.

GF12421137101 (Subaward, Davis, M.M.) 11/16/10-11/30/14
University of Virginia / Bill and Melinda Gates Fdn. OPP 1017093
"Exploration of the biological basis for underperformance of OPV and rotavirus vaccines in Bangladesh"
Stanford is developing and implementing a number of powerful new methodologies in order to define metrics and biomarkers of immunological health in the context of vaccine efficacy.

Alliance for Lupus Research (Utz, P.J.) 02/01/12-01/31/15
"SLE Target Identification Using CyTOF and Multiplexed Assays"
To identify which autoantibodies are most active in which patients using CyTOF to analyze patient blood cells for their defects and responses to potential therapies such as rituximab (Rituxan) and belimumab (Benlysta).

1U19AI100627 (Ulevich, R.) 09/01/12-08/31/17
Prime Sponsor: National Institutes of Health
The Scripps Research Institute
“Systems Approach to Immunity and Inflammation Core E - CyTOF Flow Cytometry”
Create and standardize Ab and single cell expression of mRNA panels towards the creation of an “immune system reference map” with associated correlative immune maps.

Gilead Research Agreement (Nolan, G.P.) 03/22/12-03/14/15
Gilead Sciences, Inc.
“Signaling Networks and Functional Responses in Immune Cell Subsets and Their Relation to Host Control of HIV Infection”

Department of Defense (Nolan, G.P.) 09/30/12-09/29/17
(CDMRP) Ovarian Cancer Teal Innovator Award
“Organizing the Cellular and Molecular Heterogeneity in High-Grade Serous Ovarian Cancer by Mass Cytometry”
Major Goals: to identify markers that delineate tumor cell sub-sets, determine the functional significance of these subsets for tumor initiation and maintenance, define key signaling pathways within these subsets, and assess their response to current agents as well as agents in therapeutic development.

Food and Drug Administration (Nolan, G.P.) 10/01/12-09/30/15
HHSF223201210194C
“Cross-Species Immune System Reference”
1. How do people of different ages, genders and ethnicities respond differently to biological countermeasures modulating cellular signaling. 2. How accurately do animal models reflect the signaling events observed in humans. The resulting data will be placed in an open-access resource.

NIH - Northrop-Grumman Corporation 10/01/12-09/30/17
7500108142
“Bioinformatics Integration Support Contract (BISC) IMMPORT Proposal”
To develop a database and web portal to centralize and integrate immunology data from NIAID's Division of Allergy, Immunology and Transplantation funded studies.

R01CA184968 (Sikic, B.I.) 05/06/14 - 04/30/18
NIH
“(PQD2) New Biomarkers and Pathways to Enhance Cure in Ovarian Cancers”
This study will investigate by CyTOF profiling primary ovarian cancer signaling to determine drug sensitivity.

1 R33 CA183654-01 (Nolan) 07/01/14-06/30/17
NIH
“Highly multiplexed ion-beam tissue molecular imaging with sub-micron resolution”
The objective of this project is to develop multiplexed ion beam imaging via secondary ion mass spectrometry for detection of mass-tagged antibodies.

R01AI073724 (Nolan, G.P.) 05/01/09-04/30/15
NIH
“MiroRNAs as T Cell Sensitivity Rheostats”
This study will provide fundamental insight as to how aberrant miRNA expression may contribute to the pathogeneses of autoimmune diseases

W81XWH-14-1-0180 (Nolan, G.P.) 07/01/14-06/30/17
DOD Department of the Army

"Next-Generation Molecular Histology Using Highly Multiplexed Ion-Beam Imaging (MIBI) of Breast Cancer Tissue Specimens for Enhanced Clinical Guidance"
Addition of multiple biomarkers to expand pathology assessment to enable prediction for breast cancer risk.

R33CA183692 (Weiss, W.A.) 05/01/14 - 04/30/17
NIH
"Integrating single-cell mass cytometric and transcriptomic profiles of solid tumors"
To characterize tumor heterogeneity, using GBM for validation of the tool. Results to be compared directly with microarray data from clinical samples to corroborate characterization.

1R01GM10983601 (Wong, Wing H.) 07/15/14-04/30/18
National Institutes of Health
"Multivariate statistical methods, flow cytometry and network modeling"
Achieve ten-plex lanthanide-tagged RNA detection; Validate and characterize ten-plex RNA multiplexing assay

201303028-01 (Nolan, G.P.) 09/15/14-03/31/16
Prime Sponsor: National Institutes of Health
University of California, Davis
"Development of multiplexed in situ hybridization for detection of multiple RNA targets using branch chain DNA (bDNA) amplification"
To develop a next-generation mass-tag-based imaging method to detect up to 100 ISH RNA targets in individual cells and tissues simultaneously with single-molecule sensitivity.

1R01NS08953301 (Blau, H.M.) 09/30/14-05/31/18
National Institutes of Health
"Mass Cytometry Analysis of Signaling Dysfunction in Duchenne Muscular Dystrophy"
To study defects in the signaling networks of dysfunctional MuSC subsets using CyTOF and artificial bioengineered stem cell niches.

OPP1113682 (Davis, M.M.) 11/04/14-09/30/24
Bill & Melinda Gates Foundation
"Stanford Human Systems Immunology Center"
To establish a state-of-the-art center for immunological analysis

CMEK162AUS06T (Medeiros, B.C.) 11/19/14-11/18/17
Novartis Pharmaceuticals Corp
"A Phase I study of MEK inhibitor MEK162 combined with Idarubicin and Cytarabine induction in patients with relapsed/refractory RAS-mutated acute myeloid leukemia"
Use CyTOF for single cell studies within Clinical Trial

1UH2 AR067676-01 (PI: Utz) 09/20/14-09/19/19
National Institutes of Health
"Stanford Technology Accelerating Medicines Partnership Center"
The broad, long-term objective of STAMP is to serve as the leader within the AMP Network in the development, implementation, and dissemination of RNA-Seq based and multiplexed mechanistic cellular and imaging assays for the AMP Program.

Completed

N01-HV-28183 (Nolan, G.P.) 09/30/02-09/29/09
NIH, NHLBI
"Proteomic Analysis of Blood Components in Autoimmune Disease"

The major goal of this project is to develop proteomic approaches to studying autoimmune disease.