

CURRICULUM VITAE

Name: Philip John Norris

Position: Adjunct Professor
Department of Laboratory Medicine

Clinical Professor
Department of Medicine
University of California, San Francisco

Senior Investigator and Director of Laboratory Sciences, SF
Vitalant Research Institute

Vice President, Research and Scientific Programs
Vitalant

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EDUCATION:

1985-1989	University of California, Berkeley	B.A.	Molecular Biology
1985-1989	University of California, Berkeley	B.S.	Bioengineering
1991-1995	College of Physicians & Surgeons, Columbia University	M.D.	
1995-1996	The Presbyterian Hospital in the City of New York	Intern	Internal Medicine
1996-1998	Duke University Medical Center	Resident	Internal Medicine
1998-2001	Massachusetts General Hospital and Brigham and Women’s Hospital, Harvard University	Fellow	Infectious Diseases

LICENSES, CERTIFICATION:

1995	Diplomate of National Board of Medical Examiners
1996	Diplomate of American Board of Internal Medicine
1996-2010	Board Certified in Internal Medicine
2000-now	Board Certified in Infectious Diseases
2004	California medical license, number A87646

PRINCIPAL POSITIONS HELD:

2002-2003	Massachusetts General Hospital	Instructor in Medicine
2004-2012	Vitalant Research Institute	Associate Investigator
2012-now		Senior Investigator
2009-2015		Associate Director, VRI
2015-2017		Co-Director, VRI
2017-now		Director, Laboratory Science SF
2015-now	Vitalant	Vice President, Research & Scientific

2005-2009 UCSF Department of Laboratory Medicine
 2009-2013
 2013-now
 2005-2009 UCSF Department of Medicine
 2009-2013
 2013-now

Programs
 Adjunct Assistant Professor
 Adjunct Associate Professor
 Adjunct Professor
 Assistant Clinical Professor
 Associate Clinical Professor
 Clinical Professor

OTHER POSITIONS HELD CONCURRENTLY:

2004-2008 Vitalant Research Institute
 2004-2009
 2004-now
 2004-2006 Gladstone Institute of Virology and Immunology
 2005-now UCSF-GIVI Center for AIDS Research
 2006-2010 Blood Centers of the Pacific
 2010-2014 Charisela, Inc.
 2016-now UCSF AIDS Research Institute

Director Immunology Core Lab
 Director Immunology
 Member Steering Committee
 Visiting Scientist
 Associate Director
 Staff Physician
 Scientific Advisory Board
 Executive Committee

HONORS AND AWARDS:

1985 National Merit Scholar
 1985 California Scholarship Federation Award
 1985 Bank of America Scholar's Award
 1985-1989 James B. Black Award (Pacific Gas & Electric Co. 4 year scholarship)
 1985-1989 University of California Alumni Association Scholar
 1985-1989 University of California Chancellor's Scholar
 1995 Letter of Commendation for Teaching Excellence, College of Physicians & Surgeons, Columbia University
 1999-now Chairman, P&S Class of 1995
 2000-2005 Doris Duke Charitable Foundation Clinical Scientist Development Award
 2009 Fellow, Infectious Diseases Society of America

KEYWORDS/AREAS OF INTEREST:

HIV, West Nile virus, infectious diseases, immunology, T cells, blood transfusion, alloimmunization

PROFESSIONAL ACTIVITIES

CLINICAL

Attending, Infectious Diseases Consult Service, ZSFG: I have attended for one month per year on the consult service since 2005.

On-call medical coverage, Blood Centers of the Pacific: From 2006 through 2010 I provided after hours and weekend coverage (approximately 1 in 6 days) for medical issues surrounding blood donation and donor suitability.

SUMMARY OF CLINICAL ACTIVITIES

Since 2005 my clinical activities have focused on areas most relevant to my research, namely infectious diseases and blood banking. The month of infectious diseases attending at ZSFG is provided without salary support. In addition to time attending on the wards I keep current with infectious disease topics through attendance of weekly tri-hospital ID rounds at the Parnassus campus. I also participate on a weekly medical

directors' conference call hosted by corporate headquarters in Scottsdale, Arizona, which focuses on issues of more national significance for blood banking.

PROFESSIONAL ORGANIZATIONS

Memberships

1997-1998	American College of Physicians
1999-2000	American Medical Association
1999-2003	Massachusetts Infectious Disease Society
1999-now	Infectious Disease Society of America
2004-now	American Association of Immunologists
2004-now	American Society for Microbiology
2007-now	American Association of Blood Banks
2011-now	International AIDS Society

Service to Professional Organizations

2004-now	International AIDS Society, Abstract Review, International AIDS Conference
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SERVICE TO PROFESSIONAL PUBLICATIONS

2013-now Referee for multiple journals, including Blood, Cytometry A, Journal of Infectious Diseases, Journal of Virology, Nature Medicine, PLoS Pathogens

2007-2009	Regular reviewer for <u>AIDS</u>
2009-2012	Editorial Board Member, <u>Virulence</u> ,
2011-2013	Academic Editor, <u>PLoS ONE</u>
2011-2015	Editorial Board Member, <u>Frontiers in HIV and AIDS</u>
2015-2017	Associate Editor, <u>Frontiers in HIV and AIDS</u>
2012-now	Editorial Board Member, <u>Retrovirology</u>
2014-now	Editorial Board Member, <u>Transfusion</u>
2017-now	Associate Editor, <u>Frontiers in Viral Immunology</u>

INVITED PRESENTATIONS

INTERNATIONAL

2000	Thai International AIDS Conference; Bangkok, Thailand (invited talk)
	International AIDS Conference; Durban, South Africa (oral abstract)
	Canadian National Advisory Panel, Agouron Pharmaceuticals; Toronto, Canada (invited talk)
2001	British Society for Immunology; Harrogate, UK (invited talk)
2002	AIDS Prevention in Nigeria Initiative, Workshop for Nigerian HIV Treatment; Dakar, Senegal (invited talk)
2003	AIDS Prevention in Nigeria Initiative, Vaccine Think Tank; Abuja, Nigeria, (invited talk, session co-Chair)
2006	AIDS Vaccine 2006, Amsterdam, Netherlands (invited talk)
2010	Annual Meeting of the Australian Red Cross Blood Service, Melbourne, Australia (invited talk)
2011	Back to the Future? Symposium on Fresh Whole Blood, Bergen, Norway (invited talk)
2013	University of Essen, Germany (visiting scientist, invited talk)
	Tropical Integration Program, University of Sao Paulo, Brazil (invited talk)
2014	Institute of Tropical Medicine Symposium, University of Sao Paulo, Brazil (invited talk)
	Institute for Blood Transfusion, Chengdu, China (invited talk)
	2 nd International Conference on Occult HBV Infection, Guangzhou, China (invited talk)
2015	Institute of Tropical Medicine Symposium, University of Sao Paulo, Brazil (invited speaker)

- 2016 Institute of Tropical Medicine Symposium, University of Sao Paulo, Brazil (invited speaker)
China International Transfusion Infections Control, Kunming, China (invited speaker)
- 2018 International Society for Biological and Environmental Repositories, Luxembourg (invited speaker)
- 2019 14th International Seminar on Blood Safety, Berlin, Germany (invited speaker)

NATIONAL

- 2001 Institute of Human Virology Annual Meeting; Baltimore, MD (invited talk)
- 2002 American Association of Immunologists, Experimental Biology 2002; New Orleans, LA (oral abstract)
AIDS Prevention in Nigeria Initiative, Data Management Workshop; Boston, MA (consultant)
Spring Summit on HIV, GlaxoSmithKline; Santa Fe, NM (invited talk)
- 2004 American Association of Immunologists Advanced Course in Immunology; Palo Alto, CA (invited talk)
- 2006 Advisory Committee on Blood Safety and Availability, Washington, DC, 2006 (invited talk)
Immunology 2006, Boston, MA (oral abstract)
American Association of Blood Banks Annual Meeting & TXPO, Miami Beach, FL (oral abstract)
2nd annual CHAVI Meeting, Durham, NC (invited talk)
- 2007 NHLBI Working Group on immune consequences of allogeneic exposures, Bethesda, MD (invited talk)
Global HIV Vaccine Enterprise: Innate and Mucosal Immunity Workshop, Durham, NC (invited talk)
American Association of Blood Banks Audioconference Series (invited talk)
- 2008 Center for HIV/AIDS Vaccine Immunology (CHAVI) Discovery Team, Durham, NC (invited talk)
- 2009 Advances in WNV Research (NIH sponsored conference), Bethesda, MD (invited talk)
American Association of Blood Banks Annual Meeting & TXPO, New Orleans, LA, (oral abstract)
- 2011 West Nile virus persistence workshop, Houston, TX (invited participant)
Stored RBC Lesion Grantees' Meeting & NHLBI Working Group on Strategies to Optimize Blood Products, Bethesda, MD (invited talk)
American Association of Blood Banks, San Diego, CA (invited talk and session chair)
- 2012 WIHS/MACS Joint Executive Committee Meeting, Bethesda, MD (invited talk)
Stored RBC Lesion Grantees' Meeting & NHLBI Working Group on Strategies to Optimize Blood Products, Bethesda, MD (invited talk)
- 2013 American Academy of Microbiology WNV Colloquium, Denver, CO (invited panelist)
Stored RBC Lesion Grantees' Meeting & NHLBI Working Group on Strategies to Optimize Blood Products, Bethesda, MD (invited talk)
- 2014 Academy of Clinical Laboratory Physicians & Scientists, San Francisco, CA (invited talk)
American Association of Blood Banks, Philadelphia, PA (invited talk)
- 2015 NHLBI AIDS Working Group, Bethesda, MD (invited panelist/speaker)
- 2016 American Association of Blood Banks, Orlando, FL (session organizer, invited talk)
FDA Red Blood Cell Workshop, Bethesda, MD (invited talk)
- 2017 NIAID Symposium on Molecular Mechanisms of Immune Privilege, Bethesda, MD (invited talk)
American Association of Blood Banks, San Diego, CA (invited talk)
- 2018 American Association of Blood Banks, Boston, MA (oral abstract)

REGIONAL AND OTHER PRESENTATIONS

- 2002 Massachusetts General Hospital Infectious Diseases Grand Rounds
- 2003 Blood Systems Research Institute; San Francisco, CA
- 2004 UCSF Department of Laboratory Medicine Grand Rounds
UCSF Center for AIDS Research Steering Committee Meeting
- 2005 UCSF Division of Infectious Diseases Retreat
UCSF Laboratory Medicine Resident Lecture
Columbia P&S Alumni Day Symposium, New York, NY
UCSF/GIVI CFAR Mentoring Workshop
Retrovirology Epidemiology Donor Study (REDS) II PI Meeting, Washington, DC
Case discussant, SFGH Morbidity and Mortality Conference
- 2006 Massachusetts General Hospital, Harvard Medical School, Charlestown, MA

- UCSF Transfusion Committee
 Blood Centers of the Pacific (BCP), Medical Services Advisory Committee
 Chiron Corporation, Emeryville, CA
 BCP/UCSF Transfusion Safety Seminar
 UCSF Lab Medicine Residents Lecture
 Blood Centers of California Board Meeting, Santa Barbara, CA
- 2007 National Science Foundation Postdoc Data Project Workshop, The Greenberg Studios, San Francisco
 Blood Systems Laboratories, Tempe, AZ
 REDS II PI Meeting, Rockville, MD
 BSI Medical Directors Meeting, San Francisco, CA
 Multicenter AIDS Cohort (MACS) and Women's Interagency HIV (WIHS) Study Meeting, Bethesda, MD
 Gen-Probe Inc., San Diego, CA
 Reverse Site Visit, Women's Interagency HIV Study, Washington, DC
 American Red Cross Laboratories, Rockville, MD
 TAG Vaccine meeting, Davis, CA
 Microbiology and Immunology course lecture, UC Davis
 Navigant Advisory Board meeting, Washington, DC
- 2008 UCSF Immunology Journal Club
 Massachusetts General Hospital, Harvard Medical School, Charlestown, MA
 California Blood Bank Society Annual Meeting, San Diego, CA
 NIH SCCOR Transfusion Related Acute Lung Injury (TRALI) meeting, Mayo Clinic, Rochester, MN
 NIH WIHS/MACS joint Executive Committee meeting, Bethesda, MD
 Blood Systems Laboratories, Tempe, AZ
 UCSF Infectious Diseases Journal Club
- 2009 Symposium on HIV/AIDS, Episcopal Church of Our Saviour, Mill Valley, CA
 UCSF/GIVI Center for AIDS Research External Advisory Committee, San Francisco, CA
 One Lambda Advanced HLA Technical Program, Rancho Mirage, CA
 Americas Blood Centers Technical/Lab Directors Workshop, Chicago, IL
 CaridianBCT site visit, Lakewood, CO
- 2010 Thomas Jefferson Medical College, Philadelphia, PA
 Benaroya Research Institute at Virginia Mason, Seattle, WA
 California Blood Bank Society Annual Meeting, Anaheim, CA
 University of California, Davis
 BSI Medical Directors' Annual Meeting, Scottsdale, AZ
 UCSF-GIVI CFAR Mentee Meeting
 Basic Laboratory Investigation of Natural Groups Meeting, UCSF
- 2011 Denver CFAR/Infectious Diseases grand rounds, Denver, CO
 California Blood Bank Society Annual Meeting, Las Vegas, NV
- 2012 Creative Testing Solutions Medical Advisory Board Meeting, Scottsdale, AZ
 Hawaii Center for AIDS Retreat, Honolulu, HI
 AIDS Research Institute TAG Vaccine Meeting, Richmond, CA
 UCSF Administration Business Officers Group, San Francisco, CA
 Symposium on Cell Therapeutics in Trauma and Critical Care, San Francisco, CA
- 2013 Blood Centers of California Board Meeting, San Francisco, CA
 Cellular Therapy Symposium, Scottsdale, AZ
 Michael W. Hansen Annual Critical Care Conference, Albuquerque, NM
- 2014 BayViro Symposium, Berkeley, CA
 Terumo BCT Scientific Forum, Denver, CO
 New York Blood Center, New York, NY
- 2015 BayViro Symposium, Berkeley, CA
- 2016 BayViro Symposium, Berkeley, CA
 Creative Testing Solutions Medical Advisory Committee
- 2017 Terumo BCT Scientific Forum, Denver, CO
- 2018 Xtalk webinar

2019 ARCS Foundation, San Francisco, CA

CME COURSES ATTENDED

2004	Conference on Retroviruses and Opportunistic Infections Keystone Symposium: Molecular Mechanisms of HIV Pathogenesis
2005	ASCI/AAP Joint Meeting
2006	Pain Management and End of Life Care online course, Cedars-Sinai Medical Center American Association of Blood Banks Annual Meeting
2007	American Association of Blood Banks Annual Meeting
2008	Keystone Symposium: HIV Pathogenesis
2009	United Blood Services Annual Medical Directors Meeting American Association of Blood Banks Annual Meeting
2010	United Blood Services Annual Medical Directors Meeting American Association of Blood Banks Annual Meeting
2011	California Blood Bank Society Annual Meeting American Association of Blood Banks Annual Meeting
2012	American Association of Blood Banks Annual Meeting
2014	Academy of Clinical Laboratory Physicians & Scientists American Association of Blood Banks Annual Meeting
2015	American Association of Blood Banks Annual Meeting
2016	American Association of Blood Banks Annual Meeting
2017	American Association of Blood Banks Annual Meeting
2018	American Association of Blood Banks Annual Meeting

GOVERNMENT and OTHER PROFESSIONAL SERVICE

2005	National Institutes of Health, NIAID	Special Emphasis Panel Member
2007	National Institutes of Health, NHLBI Doris Duke Charitable Foundation	Working Group member Grant Reviews
2008	National Institutes of Health, NHLBI National Institutes of Health, NHLBI	Special Emphasis Panel Member Working Group member
2009	National Institutes of Health, NIAID Department of Defense PRMP US Army MRMCC	Special Emphasis Panel Member Peer Review Panel Member Peer Review Panel Member
2010	National Institutes of Health, NIAID National Institutes of Health, NHLBI US Army MRMCC	Special Emphasis Panel Member Special Emphasis Panel Member Peer Review Panel Member
2011	National Institutes of Health, NHLBI Pacific-Southwest Regional Center of Excellence Medical Research Council, UK Medical Research Council, South Africa	Special Emphasis Panel Member Peer Review Panel Member Peer Review Panel Member Peer Review Panel Member
2012	National Institutes of Health, NIAID National Institutes of Health, LRP Medical Research Council, UK	Peer Review Panel Member Peer Review Panel Member Peer Review Panel Member
2013	Canadian Institutes of Health Research National Institutes of Health, NHLBI National Institutes of Health, LRP Landsteiner Stichting voor Bloedtransfusie Research (Netherlands)	Peer Review Panel Member Special Emphasis Panel Member Peer Review Panel Member Peer Review Panel Member
2014	Canadian Institutes of Health Research National Institutes of Health, NIAID	Peer Review Panel Member Special Emphasis Panel Member
2015	National Institutes of Health, NHLBI National Institutes of Health, NIAID	Special Emphasis Panel Member Special Emphasis Panel Member

	New York Blood Center	Scientific Advisory Committee Member
	Canadian Institutes of Health Research	Canada Research Chair Reviewer
	Wellcome Trust/ DBT India Alliance	Fellowship Reviewer
2016	National Institutes of Health, LRP	Peer Review Panel Member
	US Department of Defense	Peer Review Panel Member
	National Institutes of Health, NHLBI	Outstanding Investigator Award Review
	National Institutes of Health, NHLBI	P01 Special Emphasis Panel Member
2017	Florida Department of Public Health	Zika Virus Grant Review
	National Institutes of Health, LRP	Peer Review Panel Member
	Netherlands Organization for Scientific Research	Innovative Research Grant Review
	National Institutes of Health, NHLBI	P01 Special Emphasis Panel Member
	National Institutes of Health, NHLBI	Member, P01 Study Section
2018	National Institutes of Health, NHLBI	Member, P01 Study Section
2019	National Institutes of Health, NHLBI	Member, P01 Study Section

UNIVERSITY AND PUBLIC SERVICE

UNIVERSITY SERVICE

SYSTEMWIDE

UCSF CAMPUS-WIDE

2005-now	Associate Director, UCSF-GIVI Center for AIDS Research
2004	Grant Review, UCSF Center for AIDS Research Pilot Awards
2005	Grant Review, Comprehensive AIDS Research Center/AIDS Research Institute Pilot Awards
2006	Grant Review, UCSF Center for AIDS Research Basic Science Awards
2008-now	UCSF Resource Allocation Program, Basic HIV/AIDS, Infectious Diseases, Global Health Review Committee (Committee Chair 2008-2013, Vice Chair 2013-now)
2011-2014	Chair, UCSF-GIVI CFAR Industry Relations Committee
2016	Executive Committee, UCSF AIDS Research Institute

DEPARTMENTAL SERVICE

2008-2013	Department of Laboratory Medicine	Appointment, Promotion, and Merit Committee
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PUBLIC SERVICE

2004-2007	Confirmation Mentor, Episcopal Church of Our Saviour, Mill Valley, CA
2005-2006	Stewardship Chair, Episcopal Church of Our Saviour, Mill Valley, CA
2009	Chair, Ushers Committee, Episcopal Church of Our Saviour, Mill Valley, CA
2011-2013	Vestry member, St. Stephen's Episcopal Church, Belvedere, CA
2011-now	Chair, Newcomer's Committee, St. Stephen's Episcopal Church, Belvedere, CA

TEACHING and MENTORING

FORMAL SCHEDULED CLASSES FOR UCSF STUDENTS

2018	BMS270: Viral Immunology
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POSTGRADUATE AND OTHER COURSES

2004	Faculty, American Association of Immunologists Advanced Course in Immunology
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Predocctoral Students Supervised or Mentored

Dates	Name	Program or School	Role	Current Position
2000-03	Howell Moffett	Post-undergraduate	Research associate	U Washington Res. Fellow
2003	Margaret Clark	Post-undergraduate	Research associate	Biology Teacher, Switzerland
2004,-06	Thomas Busch	UCSD undergraduate	Summer intern	Assoc. Scientist, 96 Proteins
2007-08	Julie Brooker	SF State post-bac.	Research intern	Applying to med school
2008	Kelly Svoboda	UCSD undergraduate	Summer intern	CAN, BrightStar Care
2009	Gillian Kruskal	Post-undergraduate	Summer intern	Tufts Veterinary student
2009	Tierney Allen	UCB undergraduate	Summer intern	Eastern Virginia med student
2010	Samantha Shum	UCB undergraduate	Summer intern	Consultant, Kaiser Permanente
2010	Jeffrey MacArthur	Post-undergraduate	Summer intern	Research Associate, Celgene
2011	Andrew Larson	UCSF medical student	Summer intern	UCSF medical student
2013	Juliet Matgen	USC undergraduate	Summer intern	USC undergraduate
2014	Nathalie Lambrecht	St. Mary's undergraduate	Summer intern	Research Associate, University of Michigan
2015	Chinmayi Aryasomayajula	UCLA undergraduate	Summer intern	UCLA undergraduate
2015	Tatiana Assone	University of Sao Paulo	Ph.D. candidate	Postdoc, U. Sao Paolo
2015-16	Erika de Menezes	University of Sao Paulo	Ph.D. candidate	Post-doctoral fellow, BSRI

Postdoctoral Fellows and Residents Directly Supervised or Mentored

Dates	Name	Fellow	Faculty Role	Current Position
2004-09	Rachel Owen, PhD	Post-Doc	Research supervisor	Scientist II, VRI
2004-05	Jutta Kollett, PhD	Post-Doc	Research supervisor	Senior Scientist, Miltenyi, Germany
2005-09	Marion Lanteri, PhD	Post-Doc	Research supervisor	Director, Scientific Affairs, Cerus
2005-09	Moraima Pagan, PhD	Post-Doc	Research supervisor	Sr. Global Product Mgr., Singulex
2006-09	Huimin Jiang, PhD	Post-Doc	Career mentor	Senior Scientist, Complete Genomics
2008-12	Rachael Jackman, PhD	Post-Doc	Research supervisor	Assistant Investigator, VRI, UCSF
2009-11	Bittoo Kanwar, MD	Fellow	Career mentor	Assoc Director, Gilead
2010-11	Shiquan Wu, PhD	Post-Doc	Research supervisor	Scientist, Gilead
2010-14	Evan Jacobs, PhD	Post-Doc	Research supervisor	Scientist, Bayer
2010-13	Joseph Carrillo, PhD	Post-Doc	Research supervisor	Senior Scientist, Abbvie
2011-16	Ali Danesh, PhD	Post-Doc	Research supervisor	Staff Scientist, VRI
2016-now	Chaz Langlier, MD, PhD	Fellow	Career mentor	Fellow, UCSF
2016-18	Manasi Madiwale, MD	Fellow	Research supervisor	Physician, CMC Manteca
2017-now	Erika de Menezes	Post-Doc	Research supervisor	Post-doctoral fellow, VRI

INFORMAL TEACHING

2005-now Attending rounds, Infectious Diseases service, ZSFG (one month per year with one fellow, one resident, and two medical students per rotation)

FACULTY MENTORING

FACULTY MENTORED

2008-2018 Sheila Keating, Ph.D. Dr. Keating was Director of the VRI Core Immunology Laboratory, a Senior Scientist at VRI and Adjunct Associate Professor at UCSF. I supervised her and mentored her career development.

2009-2016 Marion Lanteri, Ph.D. Dr. Lanteri finished her postdoctoral fellowship in my laboratory and was promoted to a scientist then Assistant Investigator at VRI and Adjunct Assistant Professor at UCSF. In 2016 she took a position as Director of Scientific Affairs for Cerus Corporation.

2012-now Rachael Jackman, Ph.D. Dr. Jackman finished her postdoctoral fellowship in my laboratory and is now an Assistant Investigator at BSRI and Adjunct Assistant Professor at UCSF. She is developing mouse models to better understand transfusion immunology. I supervise her and mentor her career development.

2016-2018 Ali Danesh, Ph.D. Dr. Danesh finished his postdoctoral fellowship in my laboratory, then was junior faculty at VRI. He was measuring the effects of extracellular vesicles found in blood products on the immune system. I supervised him and mentored his career development.

OTHER VISITING FACULTY SUPERVISED

TEACHING AIDS

OTHER

TEACHING AWARDS AND NOMINATIONS

1995 Letter of Commendation for Teaching Excellence, College of Physicians & Surgeons, Columbia University

1998 Nominated for Golden Apple (House Staff teaching) Award, Duke University Medical Center

SUMMARY OF TEACHING HOURS

2012-2013 Total hours of teaching (including preparation): 375 hours
Formal class or course teaching hours: 0
Informal teaching hours: 350 hours
Mentoring hours: 25 hours

2013-2014 Total hours of teaching (including preparation): 375 hours
Formal class or course teaching hours: 0
Informal teaching hours: 350 hours
Mentoring hours: 25 hours

2014-2015 Total hours of teaching (including preparation): 375 hours
Formal class or course teaching hours: 0
Informal teaching hours: 350 hours
Mentoring hours: 25 hours

TEACHING NARRATIVE

Since my last review I have continued to provide research supervision and mentoring to the post-doctoral fellows in my laboratory and have focused on developing post-doctoral training opportunities at VRI in areas such as laboratory management and English language instruction for foreign post-doctoral fellows. I also have been serving as a mentor in the Center for AIDS Research mentoring program since 2006. Finally, I maintain clinical teaching responsibilities at ZSFG, attending on the Infectious Diseases service for one month per year.

RESEARCH AND CREATIVE ACTIVITIES**RESEARCH AWARDS AND GRANTS**

R21 HL124260 (Norris) NIH/NHLBI Validating the link between NXPH2 and alloimmunization The over all goal of this study is to develop the necessary reagents and perform the preliminary studies needed to confirm and extend the association between NHPH2 and alloimmunization and determine if NXPH2 plays a functional role in immune modulation.	08/15/15 – 12/31/17 \$125,000	1.8 calendar
HHSN268201100001I (Busch) NIH/NHLBI Recipient Epidemiology and Donor Evaluation Study-III – Central Laboratory BSRI is the REDS-III Central Laboratory and biospecimen repository providing technical laboratory expertise and participating in all REDS-III domestic and international activities. The Central Lab also conducts laboratory-based studies and participates in processing/testing samples from REDS-III sites.	03/15/11 – 03/14/20 \$6,272,850 (Phase II TDC)	1.8 calendar
R01 HL121232-01A1 (Kor) NIH/NHLBI Point-of-Care RBC Washing to Prevent Transfusion-Related Pulmonary Complications This is a phase I/II clinical trial to study the impact of RBC washing prior to transfusion to cardiac surgery patients. Our role in the project is to measure soluble markers of inflammation, including cytokines, iron, and extracellular vesicles.	09/15/14 – 05/31/19 \$66,227	0.6 calendar
R21AI122821 (Roan) NIH/NIAID Characterization of exosomes from semen of uninfected and HIV-infected men Characterize seminal plasma exosomes from HIV-infected men to better understand how these vesicles affect the early events of sexual transmission of HIV.	03/01/16 – 02/28/18 \$62,735	0.3 calendar
R01HL133024 (Jackman) NIH/NHLBI Mechanisms regulating alloimmunization and tolerance with pathogen reduction and transfusion of allogeneic platelets The objective of this proposal is to establish a reductionist murine model in order to identify the mechanisms regulating the alloresponse to pathogen reduction treated platelets.	07/01/16 – 04/30/19 \$225,000	0.3 calendar
W81XWH-16-2-0036 (Schreiber) DoD/USAMRMC MSCs for the prevention of ARDS after pulmonary contusion and hemorrhagic shock This proposal aims to be translational and IND-enabling for clinical trials investigating the potential for MSCs to treat trauma patients suffering from ARDS.	07/01/17 – 09/30/19 \$112,921	0.12 calendar
5423 (Norris) Immunology Research Program This internal funding supports Norris lab staff, supplies, and sundry expenses for multiple research projects, as well as bid and proposal support for Dr. Norris.	01/01/17 – 12/31/17 \$229,291	2.79 calendar
Service Agreement (Norris) Terumo BCT Clinical Effectiveness of Standard Versus Mirasol-treated Apheresis Platelets in Patients with Hypoproliferative Thrombocytopenia (MiPLATE Trial)	04/01/17 – 04/30/19 \$112,136	0.09 calendar

The purpose of this investigation is to evaluate samples received from the MiPLATE trial to test for the presence of anti-HLA class I and class II antibodies in platelet transfusion recipients.

Pending (Liu) NIH	04/01/18 - 03/31/23 \$43,225	0.6 calendar
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Stroke in females with metabolic syndrome, a vascular perspective
BSRI goals are to measure extracellular vesicle (EV) quantity and phenotype in mouse plasma samples, perform platelet activation assays, and isolate EVs for use in *in vivo* mouse experiments.

R21 MH115821-01 (Abdel Mohsen) NIH/NIMH	12/01/07--11/30/19 \$50,000	0.6 calendar
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Exploring Cell-free Glycomic Interactions in HIV-associated Neurological Disorders
The goal of the project is to investigate if certain classes of circulating glycans contribute to the pathogenesis of, and/or serve as biomarkers of, HIV-associated cognitive impairment.

PENDING:

A2-6795 (Kline) DoD/USAMRMC	10/01/18 - 09/30/19 \$131,411	0.6 calendar
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Phase II: A DMSO-free Biomimetic Cryoprotective Matrix System for Bone Marrow Banking
BSRI will test cryoprotective agents obtained from X-Therma Inc. for their efficacy in preserving hematopoietic precursors during cryopreservation. Novel agents will be tested using mouse bone marrow samples using flow cytometry and functional *in vitro* assays of progenitors. Lead candidates will also be tested using human hematopoietic progenitors from bone marrow and/or blood sources. Lastly, a lead candidate will be tested for its effects on the survival of human hematopoietic stem cells using a quantitative *in vivo* bone marrow reconstitution assay in immunodeficient mice.

AN #4120745 (Norris) NIH/NHLBI	07/01/18 – 06/30/22 \$582,738	2.4 calendar
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An Omics approach to defining the role of extracellular vesicles, miRNA, and the glycome on cardiovascular disease in HIV
The objective of this proposal is to understand the role of extracellular vesicles (EVs) and their molecular cargos in the pathogenesis of HIV associated CVD through their interaction with monocytes by use of novel flow cytometric technologies in well characterized clinical HIV cohort specimens and to determine the effects of therapeutic interventions on EVs.
Role: PI

Pending (Norris) Cerus	03/01/18 – 02/29/21 \$16,303	0.12 calendar
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ReCePI HLA Antibodies Testing
BSRI staff will measure the incidence of HLA alloimmunization in study samples to contribute to the evaluation of the efficacy and safety of INTERCEPT RBCs to treat acute anemia in approximately 600-700 cardiovascular surgery patients.
Role: PI

PAST

R21 AI122821 (Roan) NIH/NIAID		03/01/16 – 02/28/18
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Characterization of exosomes from semen of uninfected and HIV-infected men
Characterize seminal plasma exosomes from HIV-infected men to better understand how these vesicles affect the early events of sexual transmission of HIV.
Role: Co-Investigator

R21 HL124260-01A1 (Norris) NIH/NHLBI		08/15/15 – 05/31/17
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Validating the link between NXPH2 and alloimmunization

This award will validate the findings of a genome-wide association study implicating NXPH2 in protection from alloimmunization. The interaction of the protein with immune cells will also be defined. Role: PI

Research Service Agreement (Norris) 01/01/16 – 02/28/17 0.3 calendar
Terumo BCT/Cerus \$124,714 direct/yr 1

HLA and Platelet Antibody Testing and Analysis and Publication (IPTAS)

BSRI will receive samples from the IPTAS trial in Italy and will test the samples for the presence of anti-HLA class I and class II antibodies and design and perform the statistical analyses of the IPTAS data.

(Norris) 03/01/15 – 12/31/15 1.2 calendar
Bonfils Blood Center \$120,000 direct/yr 1

This project would generate preliminary data to grow T cells in a closed-system bioreactor developed by Terumo BCT.

R01HL095470 (Norris) 09/18/09-07/31/13 (NCE TO 7/31/14) 3.0 calendar
NIH/NHLBI \$439,459 direct/yr 1

Title: Properties of stored RBCs: minimization of immune and vascular reactivity

The purpose of this research proposal is to discover changes that occur in stored RBC units and test methods of reversing or preventing these changes.

VA Merit Award 662-12-2-805-0364 (Wong) 04/01/12 – 03/31/16 0 calendar

This grant will explore the effect of CD4+ T cell anergy on latent HIV infection of CD4+ T cells. Our site will perform flow cytometric assays to define and sort these anergic cell populations.

P30AI027763 (Volberding) 09/01/12 – 08/31/17 0.6 calendar
NIH/NIAID \$5682 direct/yr 1

UCSF-GIVI Center for AIDS Research

The primary aim of this center grant is to nurture and sustain innovative multidisciplinary HIV research at the intersections of the basic, clinical, behavioral, and epidemiologic scientific disciplines. Funding is salary support for Dr. Norris as Associate Director, Center for AIDS Research.

U01HL072268-09S1 (Assman, Norris, Spinella) 05/10/11– 12/31/13 (NCE to 08/16) 1.2 calendar
Jointly funded by USAMRMC and NHLBI \$581,792 direct/yr 1

Transfusion Medicine and Hemostasis Clinical Trial Network (TMH CTN), Mechanism and Repository Study for the Red Cell Storage Duration Study (MARS)

Our proposal will analyze the most commonly reported and hypothesized mechanisms considered to be associated with the storage lesion and adverse outcomes in critically ill patients from the RECESS trial.

Laboratories with expertise in RBC function, nitric oxide mechanisms, the coagulation cascade, microparticle analysis and immunology will each examine hypotheses addressing mechanisms, which relate storage time to clinical outcome in transfusion recipients. This study will also develop a sample repository for future analysis.

W81XWH-10-1-0023, P00001 (Spinella, Norris) 01/15/11-11/08/12 (NCE to 08/31/14) 0 calendar
DoD/USAMRAA \$469,589 direct/yr 1

Does RBC Storage Age Effect Inflammation, Immune Function and Susceptibility to Transfusion Associated Microchimerism in Critically Ill Patients?

This grant covered enrollment of patients and cytokine testing of samples from the ABLE clinical trial testing the effect of RBC age on transfusion outcome.

W81XWH-2-0028 (Spinella, Norris) 12/27/10-01/26/14 0.5 calendar
DoD/USAMRAA \$516,385 direct/yr 1

RBC Storage Effect on Coagulation, Microparticles and Microchimerism in Critically Ill Patients

This grant will cover microparticle and microchimerism testing of patients from the ABLE clinical trial testing the effect of RBC age on transfusion outcome.

HHSN2720090043C (Kwok)

09/30/09-08/31/14

0.3 calendar

NIH/NIAID

\$11,376 (sub only) direct/yr 1

Identifying epitopes recognized by influenza and flavivirus responsive CD4+ T cells following vaccination or natural infection

Goals include the mapping of CD4+ T cell epitopes and studying the phenotype of CD4+ cells identified using newly developed class II tetramers.

PEER REVIEWED PUBLICATIONS

1. Norris PJ, Sumaroka M, Brander C, Moffett HF, Boswell SL, Nguyen T, Sykulev Y, Walker BD, Rosenberg ES. Multiple effector functions mediated by HIV-specific CD4+ T cell clones. **J Virol** 75(20):9771-9779 [PMC114549](#) (2001).
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4. Norris PJ, Moffett HF, Brander C, Allen TM, O'Sullivan KM, Cosimi LA, Kaufmann DE, Walker BD, and Rosenberg ES. Fine specificity and cross-clade reactivity of HIV-1 Gag-specific CD4+ T cells. **AIDS Res Hum Retroviruses** 20(3):315-25 [PMC2553686](#) (2004).
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11. Killian SM, Norris PJ, Rawal BD, Lebedeva M, Hecht FM, Levy JA, Busch, MP. The effect of early antiretroviral therapy on and its discontinuation on HIV-specific antibody responses. **AIDS Res Hum Retroviruses** 22(7):640-7 (2006).
12. Norris PJ, Pappalardo BL, Custer B, Spotts G, Hecht FM, Busch MP. Elevations in IL-10, TNF- α , and IFN- γ from the earliest point of HIV-1 infection. **AIDS Res Hum Retroviruses** (8)757-62 [PMC2431151](#) (2006).
13. Williams JG, Tomer KB, Hioe CE, Zolla-Pazner S, Norris PJ. The antigenic determinants on HIV p24 for CD4+ T cell inhibiting antibodies as determined by limited proteolysis, chemical modification, and mass spectrometry. **J Am Soc Mass Spectrom** 17(11):1560-9 (2006).
14. Tang S, Zhao J, Storhoff JJ, Norris PJ, Little RF, Yarchoan R, Stramer SL, Patno T, Domanus M, Dhar A, Mirkin CA, Hewlett IK. Nanoparticle based biobarcode amplification assay (BCA) for sensitivity and early detection of human immunodeficiency type 1 capsid (p24) antigen. **J AIDS** 46(2):231-237 (2007).

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16. Lanteri, MC, Heitman JW, Owen RE, Busch TA, Gefer N, Kiely N, Kamel HT, Tobler LH, Busch MP, and Norris PJ. Comprehensive analysis of West Nile virus T cell responses in human infection. **J Infect Dis** 197(9):1296-1306 (2008).
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39. Carrick DM, Johnson B, Kleinman SH, Vorhaben R, Chance SC, Lee JH, Roback JD, Pandey S, Sun Y, Busch MP, [Norris PJ](#). Agreement among HLA antibody detection assays is higher in ever pregnant donors and improved using a consensus cutoff. **Transfusion** 51(5) 1105-16 [PMC3089710](#) (2011).
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NON-PEER REVIEWED PUBLICATIONS

Review Articles

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4. Reed W, Lee T-H, Norris PJ, Utter GH, Busch MP. Transfusion-Associated Microchimerism: A New Complication of Blood Transfusions in Severely Injured Patients. **Semin Hematol** 44(1):24-31 (2007).
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Books and Chapters

1. Keating SM, Jacobs E, Norris PJ. Inflammatory Cytokines. **Encyclopedia of AIDS**, Springer International (in press).
2. Zeng P, Norris PJ. Breakthrough infection and OBI: different? **Occult Hepatitis B Infection**, Science Press 2015.

3. Norris PJ, Pati S. T cell immune therapies. **Transfusion Medicine and Hemostasis**, 3rd Edition, Elsevier (2018).

Other publications

PATENTS ISSUED OR PENDING (ALLOWED)

1. Norris PJ, Rosenberg ES, Walker BD. Optimized T helper cell epitopes within HIV-1 p24 Gag. (provisional), US 60/448,761.
2. Norris PJ. Containment method and apparatus for collection of induced sputum. (provisional), US 60/490,264.
3. Norris, PJ, Keating MS, Jacobs E. A method of using cytokines and chemokines to suppress HIV replication. (provisional), US 61/643,729.

RESEARCH PROGRAM

My lab has evolved to focus on two major themes. The first is to understand how the immune system interacts with viruses, with the emphasis placed on understanding protective immune responses during acute and chronic viral infections. It is well known that disease manifestations vary among individuals infected with similar viruses, and we hope to discover the reasons for the differences. The second major area of emphasis is to explore how transfusion of blood products affects the recipient's immune system. This field is relatively less developed compared to viral immunology, and given the frequency of transfusion in the US has significant health implications. We have developed both translational and basic laboratory studies in both research areas.

A major focus of my recent viral immunology research activity has been in defining the cytokine profile associated with acute and chronic HIV infection. We originally worked with plasma donor panels to track cytokine measurements spanning time points prior to infection through the acute period of viremia and seroconversion. In collaboration with the Center for HIV/AIDS Vaccine Immunology (CHAVI) and Women's Interagency HIV Study (WIHS), we generated a much more comprehensive picture of the evolution of cytokine responses in early and chronic HIV infection. Our manuscript defining the immune perturbation of early HIV infection has been widely read, with over 200 citations since it was published in 2009. My lab has also explored how effector CD4+ T cells can help control HIV replication, focusing on effector functions of these cells and how HIV is recognized by CD4+ T cells at the molecular level. In early work we showed that HIV-specific CD4+ T cells can lyse HIV-infected target CD4+ T cells and can suppress viral replication in an MHC-restricted and cell contact dependent manner. Our work on T cell signaling has included detailed analysis of the crystal structure of how peptide-MHC interact with the T cell receptor, and defining which activation pathways are disrupted by HIV-mediated antagonism of immune responses.

Another major viral immunology theme in the laboratory has been to define the immune response associated with acute WNV infection. Most significantly, we were the first to demonstrate in humans that Treg cells contribute to control of symptomatic viral infection. These results imply that "Treg tone" may predict how people will respond to acute viral infection, and were confirmed in murine experiments in collaboration with Dr. Michael Diamond of Washington University in St. Louis.

In addition to work on immunopathogenesis of viral infections, my laboratory has successfully obtained multi-year funding to explore the immunological consequences of transfusion. We have a long history of collaboration with TerumoBCT, a company that makes pathogen reduction technology for blood products, to understand how UV light affects antigen presenting cell function and ability, with implications for immune tolerance. At a more translational level, we are supporting to major, randomized clinical trials in the US and Canada to test whether the storage time of red blood cell units affects clinical outcome in cardiac surgery and intensive care unit patients. My laboratory is building repositories of study participant samples and we are also performing immune monitoring of the study subjects to understand the mechanisms of how the age of red

blood cell units might affect clinical outcome. These studies will allow linking of clinical outcomes with measures of the underlying inflammatory state of transfused patients.

New research directions

Two major new themes are evolving in my laboratory, with initial funding already secured for both projects. In a translational research project, we identified polymorphisms in a gene associated with protection from alloimmunization in pregnancy. The gene is a secreted protein with no known immune function. We will validate the initial findings in a transfusion-induced alloimmunization cohort, and importantly determine how this secreted protein would interact with immune cells and protect from alloimmunization. If the initial observations are confirmed, many basic science questions such cellular receptor bound by and activation pathways induced by the novel protein will need to be determined. The ability to modulate the immune response would also have implications for vaccinology (inducing a better immune response) and transfusion medicine and the transplant field (down-modulating alloreactivity).

The second new major area of interest grows from my laboratory's long interest in T cell biology. The reality of using T cells therapeutically is fast approaching, with solid successes in areas such as chimeric antigen receptor (CAR) T cells or tumor infiltrating lymphocytes (TILs) for cancer therapeutics, and antiviral T cell infusions for protection of subjects with compromised immune systems, such as after bone marrow transplant. Much attention has been paid to techniques to modify T cells, and comparatively little to methods of safely and efficiently expanding these products. The blood bank is ideally positioned to produce these personalized medicines, and my laboratory has already begun research with Terumo BCT to optimize their closed system for expansion of T cells. The project involves basic engineering and optimization as well as discovery research based on my basic science knowledge of how T cells are activated and the molecular determinates of activation.

SIGNIFICANT PUBLICATIONS

1. Stacey AR*, Norris PJ*, Qin L, Haygreen EA, Taylor E, Heitman J, Lebedeva M, DeCamp A, Li D, Grove D, Self SG, Borrow P. Induction of a striking systemic cytokine cascade prior to peak viremia in acute HIV-1 infection, in contrast to more modest and delayed responses in acute hepatitis B and C virus infections. **J Virol** 83(8):3719-3733 (2009).

*These authors contributed equally to this work.

The Norris and Borrow labs collaborated to define the ontogeny of the earliest cytokine responses to HIV and contrast those to hepatitis B and C viruses.

2. Lanteri MC, O'Brien KM, Cameron MJ, Purtha WE, Lund JM, Owen RE, Heitman JW, Custer B, Hirschhorn DF, Tobler LH, Kiely N, Prince HE, Ndhlovu LC, Nixon DF, Kamel HT, Kelvin DJ, Busch MP, Rudensky AY, Diamond MS, Norris PJ. Regulatory T cells control the development of symptomatic West Nile virus infection. **J Clin Invest** 119(11):3266-77 PMC2769173 (2009).

We used access to WNV infected blood donors to show that low Treg levels correlated with symptomatic infection and collaborated with the Diamond lab to demonstrate in mouse models that Treg knock-outs were more susceptible to lethal disease.

3. Jackman RP, Utter GH, Muench MO, Heitman JW, Munz MM, Jackman RW, Biswas HH, Rivers RM, Tobler LH, Busch MP, Norris PJ. Distinct roles of trauma and transfusion in induction of immune modulation postinjury. **Transfusion** 52(12):2533-50 PMC3392528 (2012).

We collaborated with the Utter group to obtain samples from trauma patients pre-transfusion and serially post-transfusion. We found that trauma is primarily immune suppressive from the earliest time points, and that most of the immune modulation is attributable to trauma rather than transfusion.

4. Jackman RP, Deng X, Bolgiano D, Lebedeva M, Heitman JW, Busch MP, Slichter S, Norris PJ. Low-level HLA antibodies do not predict platelet transfusion failure in TRAP study participants. **Blood** 121(16):3261-6 PMC3630837 (2013).

Using newer, more sensitive HLA antibody testing it was questioned whether mid to low-level HLA antibodies would contribute to refractoriness to platelet transfusions, and they did not.

5. Danesh A, Inglis HC, Jackman RP, Wu S, Deng X, Muench MO, Heitman JW, Norris PJ. Exosomes from RBC units bind to monocytes and induce pro-inflammatory cytokines, boosting T cell responses *in vitro*. **Blood** 123(5):687-96 (2014).

We determined how the extracellular vesicle content of blood products changed with storage time and determined the mechanism of how these vesicles modulated immune cell function.