BIOGRAPHICAL SKETCH

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NAME: Utz, Paul J.

eRA COMMONS USER NAME (credential, e.g., agency login): UTZ.PAUL

POSITION TITLE: Professor of Medicine

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
King's College, Wilkes-Barre, PA	BS	06/1986	Biology
Stanford University School of Medicine	MD	06/1991	Medicine
Brigham and Women's Hospital, Boston, MA	Intern	06/1991-06/1992	Internal Medicine
Brigham and Women's Hospital, Boston, MA	Resident	06/1992-06/1993	Internal Medicine
Brigham and Women's Hospital, Boston, MA	Clinical Fellow	07/1993-02/1996	Immunology and Rheumatology

A. Personal Statement: I direct a research lab in the Department of Medicine, Division of Immunology at Stanford University School of Medicine. My lab actively collaborates with many investigators on the Stanford campus, and across the world, with a goal to disseminate and implement newly-invented technologies. We study vaccines and autoimmune diseases, including systemic lupus erythematosus (SLE), scleroderma, rheumatoid arthritis (RA), myositis, primary biliary cirrhosis (PBC), Sjögren's disease, type I diabetes (T1D), vasculitis, multiple sclerosis (MS), immunodeficiency disorders, COVID-19 related autoimmunity, mixed connective tissue disease (MCTD), autoimmunity induced by infections, POTS, and PANS. In addition to trying to better understand the pathogenic mechanisms involved in autoimmunity, we are interested in developing bench-to-bedside technologies, including multiplexed diagnostics and therapeutics, for human immune diseases. Our group made several breakthrough inventions, such as protein arrays, peptide arrays, HIT, lysate arrays, Intel arrays, and more recently EpiTOF. Multiplexed autoantibody profiling was used to make the discoveries forming the basis for my successful RECOVER supplement application to characterize autoantibodies in PASC and POTS with Mitchell Miglis and Brian Kobilka, and to study epigenetics in POTS with Purvesh Khatri and Mark Davis. Protein microarrays, cell biology methods, and other methods described in papers published in my lab will be used in this grant proposal. In terms of leadership. I have extensive expertise in coordinating 9 different program project grants over the last 15 years, including PI of our Autoimmunity Center of Excellence, and Leadership Center PI for the $41M Accelerating Medicines Partnership in RA/SLE initiative, Co-PI of Stanford's RECOVER program, and PI on biomarker studies for Pfizer's STOP-PASC Paxlovid trial. Finally, I was selected as Vice Chair of RECOVER's Immunology and Hematology Pathobiology Task Force Committee and Chair a new RECOVER Committee for identifying biomarkers for RECOVER clinical trials launched in summer 2023.

Ongoing and recently completed projects that I would like to highlight include:
Pfizer, Inc. Utz (Co-I) 10/12/2022- 04/30/2026
Paxlovid Treatment in PASC: Randomized Double-Blind Placebo-Controlled Pilot Trial
Project Number: 276613

1 R21AI172061-02 Utz (PI) 07/01/2022-06/30/2025
Epigenetic Histone Landscape Profiles in HIV

R01 AI182319-01 Utz (PI) 05/09/2023 - 04/30/2028
National Institutes of Health
Mechanisms of BNT162b2 Vaccine Immunogenicity in Systemic Lupus Erythematosus or Scleroderma

Characterization of Autoantibodies in PASC
(Supplement) Utz (PI) 03/01/2023-05/23/2025

Project Number: OT2HL161847-01 Singh (PI) 10/01/2021- 05/23/2025
National Institutes of Health
Stanford Post-Acute Recovery Cohort (SPARK); Role: co-investigator

Project Number: 8-312-0217571-66064L Cushman (PI) 09/01/2023-08/31/2025
National Institutes of Health
COVID-ACTIV-IV Anticoagulation Trial Scientific; Role: co-investigator

Project Number: 281495 Rogers (PI) 09/30/2022-09/29/2024
Stanford Institute for Immunity, Transplantation, and Infection and Stanford Autoimmune and Allergy Super Group
Inflammation and Auto-Immunity in COVID-19; Role: co-investigator

R01 AI175698-02 Fischer (PI) 05/09/2023-04/30/2028
National Institutes of Health
The Protective and Pathologic Features of the EVD Survivor Immune System; Role: co-investigator

R01 AI175771-01 Rogers (PI) 07/11/2023- 06/30/2028
National Institutes of Health
Elucidating The Immunology of Autoantibody Formation and Function in COVID-19
Role: co-investigator

1 R21 AI59578-01 Utz (PI) 04/01/2021-03/31/2024
National Institutes of Health
Investigation of Epigenetic Dysregulation in Lupus NK Cells

B. Positions, Scientific Appointments, and Honors

Positions and Scientific Appointments

2022-present	Director, Department of Medicine Team Science Program
2022-present	Chair, RECOVER Committee on Clinical Trials Biomarkers
2021-present	Vice Chair, RECOVER Immunology and Hematology Pathobiology Committee
2021-present	International Advisory Committee, PSF MAR Medical School, Barcelona
2017-present	Physician Scientist Support Foundation (PSSF) Co-Founders (Cheung, Jain, Kobilka, Lefkowitz, Utz, Yamada)
2017-present	Scientific Advisory Board, Third Rock Ventures
2020-present:	Scientific Advisory Board, Immunic, Inc
2018-present:	Scientific Advisory Board, 4D Molecular Therapeutics
02/18-present:	Associate Dean for Medical Student Research and Scholarship, Stanford University
07/13-06/18:	Program Director, Medical Scientist Training Program (MSTP), Stanford University
09/12-present:	Professor of Medicine, Stanford University School of Medicine, Stanford, CA
07/12-09/13:	Program Director, Adult Rheumatology Fellowship Program at Stanford University
05/12-2014:	Program Director, Rheumatology Adult and Pediatric Fellowship T32 Program
09/09-2012:	Co-Director, Medical Scientist Training Program (MSTP), Stanford University
06/07-12/08:	Director, Center for Clinical Immunology at Stanford, Stanford University
05/07-present:	Associate Director of Education, Institute for Immunity, Transplantation and Infection

04/07-10/07:	Acting Division Chief, Div. of Immunology/Rheumatology, Dept. of Medicine
2007-present:	Founder and Director, Stanford EXPLORE Summer Student Program
08/05-08/12:	Associate Professor of Medicine, Stanford University School of Medicine
2000-present:	Founder and Director, Stanford Institutes of Medicine Research (SIMR)
09/99-07/05:	Assistant Professor of Medicine, Stanford University School of Medicine
03/96-08/99:	Instructor of Medicine, Brigham & Women's Hospital and Harvard Medical School
02/96-03/96	Research Fellow, Lab of Dr. Paul Anderson, Dana Farber Cancer Institute

Honors

2024	Top Scholar by ScholarGPS
2024	Pantheon Winner of The Elizabeth Schar Inspiring Future Leaders Award
2023	Guest Speaker, Distinguished Seminar Immunology Series, University of Buffalo
2021	Alumnus of the Year, King's College
2018	Speaker, Immunology Seminar Series and Grand Rounds, University of Pittsburgh
2016	Rheumatology Visiting Professor and Grand Rounds Speaker, UC Denver
2012	Immunology and Rheumatology Division Teaching Award, Stanford University
2009	Mayo Clinic, Distinguished Visiting Professor, Department of Medicine
2007	American Society for Clinical Investigation, Elected
2007	The Mary Jane Kugel Award, Juvenile Diabetes Research Foundation
2006	The Kunkel Society, Elected
2002	Stanford University Immunology Graduate Program Teaching/Mentoring Award
2002,2009,2012	Stanford University, Department of Medicine Divisional Teaching Award
2000-2002	Baxter Career Development Award

C. Contributions to Science

1. **Development of Protein and Peptide Arrays for Characterizing Immune Responses.** The three major goals of these studies are: (1) To understand the mechanisms by which highly-conserved, diverse molecules and complexes such as histones and splicing particles are targeted by T and B lymphocytes, and to determine how an immune response directed against ubiquitous antigens leads to organ-specific autoimmune disease; (2) To use autoimmune sera as molecular probes to study basic cellular processes, particularly apoptosis signaling pathways, alternative RNA splicing, and GPCR signaling; (3) To invent and validate novel technologies for high-throughput, multiplex proteomics studies. My lab is currently focusing on proteomic analysis of signaling pathways; and proteins secreted by immune cells, including cytokines and autoantibodies. My lab is particularly well-known for its expertise in the areas of protein and peptide arrays, including the invention and/or application of antigen arrays, lysate arrays, HIT, cytokine/chemokine arrays, viral protein arrays, and Intel arrays.
   a. Robinson WH, DiGennaro C, Hueber W, Haab BB, Kamachi M, Dean EJ, Fournel S, Fong D, Genovese MC, Neuman de Vegvar HE, Steiner G, Hirschberg DL, Morris RI, Muller S, Pruijn GJ, van Venrooij WJ, Smolen JS, Brown PO, Steinman L & **Utz PJ.** Autoantigen Microarrays for multiplex characterization of autoantibody responses. 2002. **Nature Medicine,** 8:295-301.
   b. Price JV, Haddon DJ, Kemmer D, Delepine G, Mandelbaum G, Jarrell JA, Gupta R, Balboni I, Chakravarty EF, Sokolove J, Shum AK, Anderson MS, Cheng MH, Robinson W, Browne SK, Holland SM, Baechler & **Utz PJ**. Protein microarray analysis reveals BAFF-binding autoantibodies in system lupus erythematosus. 2013. **J. Clinical Investigation,** 123:5135-5145. PMCID:PMC3859403
   c. Chang SE, Feng A, Meng W, Apostolidis SA, Ahuja N, Chung H-R, Jagannathan P, James J, Kim PS, Meyer NJ, Nadeau K, Radic M, Robinson WH, Singh U, Wang TT, Mack E, Artandi M, Barman L, Bennett K, Chakraborty S, Chang I, Cheung P, Chinthrajah S, Dhingra S, Do E, Finck A, Gaano A, Gebner R, Giannini HM, Gonzalez J, Greib S, Gundisc M, Hsu AR, Kuo A, Manohar M, Mao R, Neel, I, Neuauer A, Oniyide O, Powell AE, Puri R, Renz H, Schapiro JM, Weidenbacher PA, Witman R, Skevaki C, Prak ET & **Utz PJ.** New-onset IgG autoantibodies in hospitalized patients with COVID-19. 2021. **Nature Communications,** 12:5417. PMCID:PMC8440763

d. Feng A, Yang EY, Moore AR, Dhingra S, Chang SE, Yin X, Pi R, Mack EKM, Völkel S, Geßner R, Gündisch M, Neubauer A, Renz H, Tsiodras S, Fragkou PC, Asuni AA, Levitt JE, Wilson JG, Leong M, Lumb JH, Mao R, Pinedo K, Roque J, Richards CM, Stabile M, Swaminathan G, Salagianni M, Triantafyllia V, Bertrams W, Blish CA, Carette JE, Frankovich J, Meffre E, Nadeau KC, Singh U, Wang TT, Prak ETL, Herold S, Andreakos E, Schmeck B, Skevaki C, Rogers AJ & **Utz PJ**. Autoantibodies are highly prevalent in non-SARS-CoV-2 respiratory infections and critical illness. **JCI Insight,** 2023 8(3):e163150. PMCID:PMC9977421

2. **Characterization of Epigenetic Modifying Enzymes in Immunology.** A major new area of my lab's efforts is to apply bioinformatics (together with Purvesh Khatri's lab), CyTOF (with Garry Nolan's lab), and peptide arrays to (1) characterize epigenetic marks in blood cells; (2) identify epigenetic enzymes such as lysine methyltransferases, acetyltransferases, deacetylases, demethylases, and peptidyl arginine deiminases that are associated with immune responses; and (3) to take advantage of this information to design new diagnostics and therapeutics such as vaccines and small molecule signaling pathway inhibitors. My lab and the Khatri lab recently developed EpiTOF by leveraging the multiplexing capacity and single-cell resolution of mass cytometry. EpiTOF enables quantitative measurements of the cellular levels of histone post-translational modifications in individual immune cells, and such identification of differential histone marks and alterations in the epigenome can then guide locus-specific analyses (e.g. CITE-seq, ChIP-seq and ATAC-seq). Using EpiTOF, we successfully identified epigenetic alterations associated with aging in the human immune system, monocyte differentiation, and vaccine responses.
   a. Matthews AG, Kuo AJ, Ramón-Maiques S, Han S, Champagne KS, Ivanov D, Gallardo M, Carney D, Cheung P, Ciccone DN, Walter KL, **Utz PJ**, Shi Y, Kutateladzem TG, Yang W, Gozani O & Oettinger MA. RAG2 PHD finger couples histone H3 lysine4 trimethylation with V(D)J recombination. **Nature,** 2007. 450:1106-1110. PMCID:PMC2988437
   b. Cheung P, Vallania F, Warsinske HC, Donato M, Schaffert S, Chang SE, Dvorak M, Dekker C, Davis MM, **Utz PJ**, Khatri P & Kuo AJ. Single-cell chromatin modification profiling reveals increased epigenetic variations with aging. 2018. **Cell**, 173:1385-1397. PMCID:PMC5984186
   c. Cheung P, Schaffert S, Chang SE, Dvorak M, Donato M, Macaubas C, Foecke MH, Li T-M, Zhang L, Coan JP, Schulert GS, Grom AA, Henderson LA, Nigrovic PA, Elias JE, Gozani O, Mellins ED, Khatri P, **Utz PJ** & Kuo AJ. Repression of CTSG, ELANE and PRTN3-mediated histoneH3 proteolyp cleavage promotes monocyte-to-macrophage differentiation. 2021. **Nature Immunology,** 196:40-48. PMCID:PMC6422338
   d. Bai L, Dermadi D, Kalesinskas L, Dvorak M, Chang SE, Ganesan A, Rubin SJS, Kuo A, Cheung P, Donato M, **Utz PJ**, Habtezion A & Khatri P. Mass-cytometry-based quantitation of global histone post-translational modifications at single-cell resolution across peripheral immune cells in IBD. 2022. **J Crohns Colitis**, Dec 26;jjac194. doi: 10.1093/ecco-jcc/jjac194.

3. **Development of Novel Vaccines, and Characterization of Influenza and COVID-19 Vaccine Responses.** A major goal of my work is to take advantage of the information provided by proteomics technologies to develop antigen-specific tolerizing therapies for common autoimmune diseases, and to characterize immune responses in vaccinated subjects. Protein and peptide arrays were used by the Utz, Robinson and Steinman labs in animal models of multiple sclerosis to identify autoantigens which were then encoded in DNA vaccines that successfully prevented and treated animal models. After founding Bayhill Therapeutics in 2002, preclinical studies led to testing of DNA vaccines, with array-based monitoring, in 3 successful clinical trials of almost 400 subjects in multiple sclerosis and juvenile diabetes. I have been actively involved in NIAID's HIPC Consortium.
   a. Robinson WH, Fontoura P, Lee BJ, Neuman de Vegvar HE, Tom J, Pedotti R, DiGennaro CD, Mitchell DJ, Fong D, Ho PPK, Ruiz P, Maverakis E, Stevens DB, Bernard CCA, Martin R, Kuchroo VK, van Noort JM, Genain CP, Amor S, Olsson T,

Utz PJ, Garren H & Steinman, L. Protein microarrays guide tolerizing DNA vaccine treatment of autoimmune encephalomyelitis. **Nature Biotechnology,** 2003. 21:1033-1039.

b. Roep B, Solvason N, Gottlieb P, Abreu J, Harrison L, Eisenbarth G, Yu L, Levitan M, Hagopian W, Buse J, von Herrath M, Quan J, King R, Robinson WR, **Utz PJ**, Garren H, The BHT 3021 Investigators & Steinman L. Plasmid encoded proinsulin preserves C-peptide while specifically reducing proinsulin specific CD8 cells in Type 1 diabetes. 2013. **Science Transational Medicine**, 5(191):191ra82. PMCID:PMC4516024

c. Arunachalam PS, Scott MKD, Hagan T, Li C, Chunfeng Li, Feng Y, Wimmers F, Grigoryan L, Trisal M, Edara VV, Lai L, Chang SE, Feng A, Dhingra S, Shah M, Lee AS, Chinthrajah S, Sindher T, MallajosyulaGao F, Sigal N, Kowli S, Gupta S, Pellegrini K, Tharp G, Maysel-Auslender S, Hamilton S, Aoued H,Hrusovsky K, Roskey M, Bosinger S, Maecker HT, Boyd SD, Davis MM, **Utz PJ**, Suthar MS, Khatri P, Nadeau KC & Pulendran B. Systems vaccinology of the BNT162b2 mRNA vaccine in humans. 2021. **Nature,** 596:410-416. PMCID:PMC7665312.

d. Wimmers F, Donato M, Kuo A, Ashuach T, Gupta S, Li C, Dvorak M, Foecke MH, Chang SE, De Jong SE, Haecker HT, van der Most R, Cheung P, Cortese M, Hagan TL, Bosinger S, Davis MM, Rouphael N, Subramaniam S, Yosef N, **Utz PJ**, Khatri P, Pulendran B. Single-cell analysis of the epigenomic and transcriptional landscape of innate immunity to seasonal and adjuvanted pandemic influenza vaccination in humans. 2021. **Cell,** (6):932-940. PMCID:PMC7303014

4. **Characterization of Blood Cells in Autoimmunity.** I co-discovered (and incorrectly named) the NFAT transcription factor as a medical student in Jerry Crabtree's lab. I studied apoptosis signaling pathways and autoantigens at Harvard following residency and fellowship. Upon arriving at Stanford as a new assistant professor, I changed direction, taking advantage of Stanford's rich technology development environment. The Utz lab has been at the forefront of inventing multiplexed assays for studying protein-protein and protein-peptide interactions for over a decade, and his lab has undergone renewed focus in recent years in studying blood cells and signaling pathways. Methods used to characterize signaling pathways include lysate arrays (invented by Steven Chan and published in **Nature Medicine** in 2004), multiparameter FACS, tetramers (invented by Mark Davis), and CyTOF (driven by Garry Nolan's lab).

a. Yiu G, Rasmussen TK, Tsai BL, Diep V, Haddon DJ, Tsoi J, Miller GD, BComin-Anduix B, Deleuran B, Crooks GM, **Utz PJ**. High interferon signature leads to increased STAT1/3/5 phosphorylation in PBMCs from SLE patients by single cell mass cytometry. 2022. **Front Immunology,** 13:833636. PMCID:PMC8851522

b. Li J, Zaslavsky M, Su Y, Sikora MJ, van Unen V, Christophersen A, Chiou S-H, Chen L, Ji X, Wilhelmy J, McSween AM, Palanski BA, Dhondalay KR, Bhamidipati K, Pai J, Kipp LB, Dunn JE, Hauser, Oksenberg JR, Satpathy AT, Robinson WR, Steinmetz LM, Khosla C, Utz PJ, Sollid LM, Heath JR, Fernandez-Becker NQ, Nadeau KC, Saligrama N, Davis MM. Human KIR+CD8+T cells target pathogenicT cells in Celiac disease and are active in other autoimmune disorders and COVID-19. 2022. **Science,** 376(6590):eabi9591. PMCID:PMC8995031

c. Sng J, Ayoglu B, Chen J, Schickel J-N, Ferre EM, Glauzy S, Romberg N, Hoenig M, Cunningham-Rundles C, **Utz PJ**, Lionakis MS & Meffre E. AIRE expression controls the peripheral selection of autoreactive B cells. 2019. **Science Immunology,** 4:34. PMCID:PMC5784431

d. Christophersen A, Lund EG, Snir O, Solà E, Kanduri C, Dahal-Koirala S, Zühlke S, Molberg Ø, Utz PJ, Rohani-Pichavant M, Simard JF, Dekker CL, Lundin KEA, Sollid LM & Davis MM. Distinct phenotype of CD4+ T cells driving celiac disease identified in multiple autoimmune conditions. 2019. **Nature Medicine,** 5:734-737. PMCID:PMC664785

Complete List of Published Work in MyBibliography:
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