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Date Prepared: 09/22/2022

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GitHub: https://github.com/jlevy44

I. EDUCATION:

2017   BS in Physics
University of California, Berkeley, CA
College of Letters & Sciences: Highest Distinction graduation (top 1%)

2021   PhD in Quantitative Biomedical Sciences (Data Science)
Dartmouth College, Geisel School of Medicine, Hanover, NH
Co-mentors: Brock C. Christensen PhD (Department of Epidemiology)
Louis J. Vaickus MD, PhD (Department of Pathology and Laboratory Medicine)

Technical and Research skills:
Python • R • Shell • Supercomputer • Machine Learning • Dataviz • PyTorch • NLP
Sklearn • Plotly • Aircraft Pilot • Dask • Matlab • Javascript • C++ • SQL
Deep Learning • Docker • AWS • LaTEX • Nextflow • CWL Pipelines • Stan
Comp. Vision • Sensibly Constructing Statistical Golems • Graph Neural Networks

Relevant coursework:
Hierarchical, Bayesian Modeling, Social Network Analysis, Epidemiology, Biostatistics,
Bioinformatics, Linear Algebra, Diff. Eq., Multivar. Calc., C++, Python, Statistics,
Machine Learning, Health Promotion, Policy, Management, Quantum Computing and
Stat Mechanics

II. POSTDOCTORAL TRAINING: N/A

III. ACADEMIC APPOINTMENTS:

2021-present   Assistant Professor, Geisel School of Medicine at Dartmouth,
Departments of Pathology and Laboratory Medicine, and Dermatology

2021-present   Adjunct Professor, Geisel School of Medicine at Dartmouth,
Department of Epidemiology

2021-present   Faculty, Geisel School of Medicine at Dartmouth,
Quantitative Biomedical Sciences

2022-present   Affiliate, Dartmouth Hitchcock Medical Center,
Department of Medicine, Section of Radiation Oncology

IV. INSTITUTIONAL LEADERSHIP ROLES:

2018-present   EDIT (Emerging Diagnostic and Investigative Technologies) Research Program
Editor, Department of Pathology and Laboratory Medicine, DHMC.
Co-director of EDIT Machine Learning and Whole Genome Sequencing arms.

V. LICENSURE AND CERTIFICATION: N/A
VI. HOSPITAL OR HEALTH SYSTEM APPOINTMENTS: N/A
VII. OTHER PROFESSIONAL POSITIONS (NON-DARTMOUTH):

April 2015-   CiBER lab, Berkeley, CA   Biomechanics Research Assistant
Jun 2016   • Agama Lizard Turns: Matlab and ProAnalyst analysis of lizard turning tendencies

Jun 2016-   Lawrence Berkeley National Lab,   Software Developer
May 2020   JGI Affiliate, Berkeley, CA
• Novel computational methods elucidate quality biofuels: pangenome phylogenetics, genomics workflows, metagenomics binning, machine learning via large-scale, automated, supercomputer pipelines (Python/Nextflow)

Jun - Dec 2017   San Francisco Department of Public Health: Tuberculosis Control,   Public Service Aide
San Francisco, CA
• Evaluated patient data integrity and transition to electronic health records.

May-Aug 2018   Zymergen, Emeryville, CA   Software Engineer Intern
• Constructed many different HPC AWS bioinformatics pipelines using CWL Docker, and Seven Bridges, storing results in SQL databases.
• Used Convolutional Neural Networks and hyperbolic embeddings to explore relationships between gene and function for discovery of biomaterials.

Jan 2020-   ArcticAI, Hanover, NH   Chief Technical Officer
present   • Developing core technology, IP, and vision for intraoperative medical device

May 2022-   ViewsML, Hanover, NH   Scientific Advisor
present   • Consulting and informatics for virtual staining technologies

Oct 2020-   Veterans Affairs Healthcare System,
present   White River Junction, VT   Statistical Consultant
• Consulting on machine learning-based natural language processing software for suicide risk prediction

VIII. PROFESSIONAL DEVELOPMENT ACTIVITIES:

2018-present   CITI Program, Biomedical Responsible Conduct of Research (RCR) course completion
2018-present   CITI Program, Biomedical Data or Specimens Research Basic course, completion
2018-present   CITI Program, Good Clinical Practice (US, FDA focus) clinical trials with investigational drugs and medical devices (GCP) course completion
2019   Supervised Teaching Workshop, Mentor Skills Development
2019   NIH Grant Workshop
2017   Coaching Corps Leadership Development Program
2016   Crisis Support Counselor Training Program

IX. TEACHING ACTIVITIES:

A. UNDERGRADUATE (COLLEGE) EDUCATION: N/A
B. GRADUATE EDUCATION:
Courses:
Professional Level / Online:

TBD	Applied Machine Learning (QBS)	150 hr/yr

Graduate Level:

2022	Participation in Scientific Research (QBS 195)	150 hr/yr
2022	Master's Capstone Experience (QBS 185)	150 hr/yr

Lectures:

2020	Introduction to Python (QBS 146)	2 hr/yr
2021	Introduction to Neural Networks (QBS 177)	2 hr/yr
2021	Application of Hierarchical Bayesian Methods to Machine Learning (QBS 122)	3 hr/yr
2021-2022	Machine Learning in Pathology (QBS 110)	3 hr/yr
2021	R Software Packaging (QBS 181)	3 hr/yr
2022	Introduction to Neural Networks (QBS 177)	2 hr/yr
2022	Artificial Intelligence @ Dartmouth Health (ENGS 56)	2 hr/yr

Supervised Teaching:
Graduate Level:

2019	Foundations of Biostatistics (QBS 120)	150 hr/yr
2020-2021	Statistical Learning for Big Data (QBS 177)	150 hr/yr
2021	Hierarchical Bayesian Modeling (QBS 122)	150 hr/yr

Graduate Workshop:

2020	Fundamentals of Bioinformatics and High-Performance Computing	3 hr/yr

C. UNDERGRADUATE MEDICAL EDUCATION: N/A
D. GRADUATE MEDICAL EDUCATION: N/A
E. MULTIDISCIPLINARY / INTERDEPARTMENTAL:

2021	Mentorship Ethics Discussion Panelist	3 hr/yr

X. RESEARCH ADVISING/MENTORING:

Program Director, EDIT (Emerging Diagnostic and Investigative Technologies)   600hrs/yr
DPLM's newly established EDIT Lab sponsors highly qualified high school students to participate in a 10-week remote internship exploring research topic in digital pathology, machine learning and statistics. Through a series of lectures, guided projects and IRB supported basic research, students develop algorithms to explore various diagnostic spaces in pathology from cancer detection, to gigapixel image manipulation to text prediction. Undergraduate, Master's and medical students have participated in the ongoing year-round internship program. Joshua Levy and Louis Vaickus manage and organize the internship as Co-PI's. At the end of the 10-week program, internship culminates with a presentation to the DPLM faculty, residents and technical staff. Six interns have manuscripts in pre-print and submitted to journals; two have been published (Azher, Vattikonda). The 2020 internship was so popular that we were able to recruit over 25 new interns for 2021 with many alumni returning to give selected lectures and mentor incoming students. A total of 30 new high school students will join the 2022 cohort.

HIGH SCHOOL STUDENTS:
2020 Summer Cohort

2020	Ajay Prabhakar	EDIT Summer Intern	Morphology Hierarchy
2020	Kaien Yang	EDIT Summer Intern	Secure Data Encryption
2020	Richard Zhan	EDIT Summer Intern	Virtual Staining
2020-Present	Sumanth Ratna	EDIT Summer Intern	Segmentation
2020-2021	Harsha Harish	EDIT Summer Intern	Cell/Tissue Clustering
2020-2021	Nishitha Vattikonda	EDIT Summer Intern	Natural Language Processing

2021 Summer Cohort

2021-Present	Sachin Kumar	EDIT Summer Intern	3D Tissue Modeling
2021-Present	Ramya Reddy	EDIT Summer Intern	Morphological-Molecular Alteration
2021-Present	Ram Reddy	EDIT Summer Intern	Morphological-Molecular Alteration
2021-Present	Akshat Alok	EDIT Summer Intern	Omics Deep Staging Models
2021-Present	Zarif Azher	EDIT Summer Intern	Multimodal Integration
2021-Present	Andrew Wang	EDIT Summer Intern	Cellular Hierarchy
2021-Present	Akash Pamal	EDIT Summer Intern	Surgical Cell Modeling
2021-Present	Irfan Nafi	EDIT Summer Intern	Surgical Cell Modeling
2021-Present	Tarushii Goel	EDIT Summer Intern	Surgical Cell Modeling
2021-Present	Abhinav Angirekula	EDIT Summer Intern	Surgical Cell Modeling
2021-Present	Cristian Clewis	EDIT Summer Intern	Tissue Staging Models
2021-Present	Abena Kyereme-Tuah	EDIT Summer Intern	Tissue Staging Models
2021-Present	Sameeksha Garg	EDIT Summer Intern	Tissue Staging Models
2021-Present	Sagar Gupta	EDIT Summer Intern	Omics Deep Staging Models
2021	John Kim	EDIT Summer Intern	3D Tissue Modeling
2021	Aryan Kumawat	EDIT Summer Intern	3D Tissue Modeling
2021	Adnan Murtaza	EDIT Summer Intern	3D Tissue Modeling
2021-Present	Edward Zhang	EDIT Summer Intern	Ink Imputation Histology
2021-Present	Taein Kim	EDIT Summer Intern	Ink Imputation Histology
2021-Present	Nikhil Kalidasu	EDIT Summer Intern	Cell Detection
2021	Mohan Liu	EDIT Summer Intern	Stain Preference
2021-Present	Michael Cheng	EDIT Summer Intern	Cytology Translation

2022 Summer Cohort

2022-Present	Utkarsh Goyal	EDIT Summer Intern	TBD
2022-Present	Sanjay Jacob	EDIT Summer Intern	TBD
2022-Present	Anish Suvarna	EDIT Summer Intern	TBD
2022-Present	Eric Feng	EDIT Summer Intern	TBD
2022-Present	Michael Fatemi	EDIT Summer Intern	TBD
2022-Present	Ananya Gottumukkala	EDIT Summer Intern	TBD
2022-Present	Aryaman Khanna	EDIT Summer Intern	TBD
2022-Present	Ram Vempati	EDIT Summer Intern	TBD
2022-Present	Nikhil Pesala	EDIT Summer Intern	TBD
2022-Present	Sameer Gabbita	EDIT Summer Intern	TBD
2022-Present	Neha Reddy	EDIT Summer Intern	TBD
2022-Present	Audhav Durai	EDIT Summer Intern	TBD
2022-Present	Christal Wang	EDIT Summer Intern	TBD
2022-Present	UnCheng Leong	EDIT Summer Intern	TBD
2022-Present	Hyunjae Chung	EDIT Summer Intern	TBD
2022-Present	Sayan Bhattacharya	EDIT Summer Intern	TBD
2022-Present	Will Crampton	EDIT Summer Intern	TBD
2022-Present	Amruta Rajeev	EDIT Summer Intern	TBD
2022-Present	An Le	EDIT Summer Intern	TBD
2022-Present	Nancy Hernandez	EDIT Summer Intern	TBD
2022-Present	Ananya Pamal	EDIT Summer Intern	TBD

2022-Present	Rushank Goyal	EDIT Summer Intern	TBD
2022-Present	Charlie Spivak	EDIT Summer Intern	TBD
2022-Present	Adam Gilbert-Diamond	EDIT Summer Intern	TBD
2022-Present	Cyril Sharma	EDIT Summer Intern	TBD
2022-Present	Christopher Perriello	EDIT Summer Intern	TBD
2022-Present	Sophie Chen	EDIT Summer Intern	TBD

A. UNDERGRADUATE
Dartmouth College, Hanover NH

2019-Present	Jason Zavras - Presidential Scholar	
		Computational Stain Normalization
		Intra-institutional digital stain preference
2020-Present	Jason McFadden	Evaluation AI Technologies
2021	Osezele Okoruwa	Stain Preference
2021-2022	Jean Yuan	Medical Informatics
2021-2022	Daniel Dong	Medical Informatics
2022-Present	William Chen	Data Evaluation
2022-Present	John Zavras - Presidential Scholar	
		Spatial Profiling
2022-Present	Sabin Hart	DNA Methylation

Middlebury College

2021-Present	Jack Greenburg	Natural Language Processing for CPT Code Billing

University of Michigan

2021-Present	Carly Miles	Medical Informatics

UC Santa Cruz

2022-Present	Bailey Thompson	Medical Informatics

University of New Hampshire

2022-Present	Tess Cronin	Machine Learning Review

Other Institutions

2022	Deepanshu Mody	DNAm Aging

B. GRADUATE:

2020-Present	Brody McNutt	Master's Student (QBS)	Secure Data Encryption
2020-2022	Julian Gullett	Master's Student (QBS)	Evaluation AI Technologies
2021-Present	Yunrui Lu	Master's Student (QBS)	Natural Language Processing
2021-Present	Uhuru Kamau	Master's Student (QBS)	Natural Language Processing
2021-Present	Shuyang Lu	Master's Student (QBS)	Natural Language Processing
2021-Present	Taylor Hudson	Master's Student (QBS)	CRISPR
2021-Present	Sean McOsker	Master's Student (QBS)	Model Explainability
2022-Present	Natt Chan	Master's Student (QBS)	Pathology
2022-Present	Ojas Ramwala	NYU Master's Graduate	Digital Pathology
2021-Present	Elizabeth Anderson	PhD Student (QBS)	Placenta Histology
2021-2022	Jeff Joseph	PhD Rotation (QBS)	Spatial Correlations
2022	Peiying Hua	PhD Rotation (QBS)	NLP
2021-Present	Sean Pietrowicz	Master's Student (QBS)	Mental Health
2022-Present	Chenhao Zhao	Master's Student (QBS)	TBD

2022-Present	Bofan Chen	Master's Student (QBS)	TBD
2022-Present	Digvijay Yadav	Master's Student (QBS)	TBD
2022-Present	Ayush Chakraborty	Master's Student (QBS)	TBD
2022-Present	Sunishka Jain	Master's Student (CS)	TBD
2021-Present	Marietta Montivero	Geisel MD PhD Student	Surgical Excision

C. MEDICAL STUDENTS:

2020-2021	Eren Veziroglu	Medical Student	Digital Spatial Profiling
2020-2021	Mustafa Nasir Moin	Prospective Medical	Digital Spatial Profiling
2022-Present	Raven Bennett	Geisel MD Student	Microbiome
2022-Present	Shahin Shahsavari	Geisel MD Student	Skin Aging
2022-Present	Faraz Farhadi	Geisel MD Student	Orthopedics
2022-Present	Harun Sugito	Geisel MD Student	Orthopedics
2022	Alex Lindqwister	Geisel MD Student	Med AI Education
2018-2021	Christian Haudenschild	Medical Student Minnesota	Federated Data Networks

D. RESIDENTS/FELLOWS:

2019-2021	Robert Hamilton	Pathology Resident/Fellow	Auto-Machine Learning
2019-2021	Chris Jackson	Pathology Resident/Fellow	Virtual Immunofluorescence
2020-2021	Ryan Glass	Pathology Resident/Fellow	Bayesian Cytology Prediction
2022-Present	Abdol Aziz	Prospective Resident	Graph Neural Networks

E. RESEARCH ASSOCIATES:

| 2018-2021 | Jorge Lima | Data Scientist | Pressure Injury Prediction |
| 2020-Present | Max Levis | Assistant Professor | NLP Suicide Risk |

F. FACULTY: N/A

XI. ADVISING / MENTORING:

A. UNDERGRADUATE STUDENTS: N/A
B. GRADUATE STUDENTS:
| 2020 | QBS Student Mentor |
| 2022 | QBS Faculty Mentor |

C. MEDICAL STUDENTS: N/A
D. RESIDENTS/FELLOWS/RESEARCH ASSOCIATES: N/A

XII. ENGAGEMENT, COMMUNITY SERVICE / EDUCATION:

2015	American Heart Association Advocacy, Advocacy Intern, Oakland, CA
2011-2019	Special Olympics, Head Coach, Walnut Creek, CA
2015-2018	Coaching Corps, King Middle School, Basketball Coach, Berkeley, CA
2015-2018	Coaching Corps Berkeley Chapter Executive Recruitment Coordinator, Berkeley, CA
2015-2017	American Foundation for Suicide Prevention, Outreach Coordinator, Berkeley, CA
2011-2016	Telescope Makers Workshop, Astronomy Docent and Telescope Maker, Mount Diablo Astronomical Society, Berkeley, CA
2015-2018	National Suicide Prevention Lifeline, American Foundation for Suicide Prevention, Oakland, CA
2019	New Hampshire Academy of Sciences Mentor, Lyme, NH
2019	New Hampshire Special Olympics Volunteer, Lyme, NH

XIII. RESEARCH ACTIVITIES:

Present:

Year	Title	Role	Amount
2021-	Prouty Grant *CRISPR Targeting of Merkel Cell Polyomavirus*	Levy J (Co-PI)	$50,000
2020-	Prouty Grant *Validation of In-Vivo Imaging* (20%)	LeBeouf M (Co-PI)	$50,000
2021-	Sun Damage Reversal Therapies (COBRE Pilot)	Levy J (PI)	$50,000
2022-	Dartmouth Hitchcock ORO Capital Investment, *Pathology Advanced Computational Environment*	Levy J (Co-PI)	$250,000
2021-	IDeA States Pediatric Clinical Trials, Biostatistics Consulting	Levy J (Co-I)	$5,000 (directs)
2020-	Dartmouth-Hitchcock Department of Psychiatry, Tucker Award	Levis M (Co-I)	$12,000 (directs)
2021-	Richard Baughman Scholar Award	Levy J (PI)	$300,000
2022	Student Digital Pathology Laboratory 2.0 (Neukom)	Levy J (Co-PI)	$18,000
2022	Stephen Marsh Tenney, M.D., Medical Student Fellowship Award	Co-Mentor	$30,000
2022	Burroughs Wellcome Fellowship	Co-Mentor	$60,000
2022	Hitchcock Foundation Pilot, Komal Satti *How Obesity Influences the Immune Repertoire in Children. A Pilot Study*	Levy J (Co-I)	$40,000

Past:

Year	Title	Role	Amount
2016	Online Mental Health Education at UC Berkeley	Levy J (Co-PI)	$30,000
2019	Burroughs Wellcome Fund, Big Data Life Sciences Fellow 100% effort	Levy J (PI)	$60,000
2020	I-Corps Business Development (33% effort)	Levy J (Co-PI)	$3,000
2020	COBRE CQB Paper Travel Award	Levy J (PI)	$2,000
2021	Dartmouth Entrepreneurs Startup Competition Finalist (33%)	Levy J (Co-PI)	$5,000
2020	Dartmouth Hitchcock ORO Capital Investment, *QDP-Alpha* (33% effort)	Levy J (Co-PI)	$160,000
2020	Neukom Institute CompX *Virtual Flow Cytometry* (20% effort)	Sriharan A (Co-I)	$40,000
2020	Neukom Institute CompX *Virtual Laboratory for Students* (95% effort)	Levy J (Co-PI)	$25,000
2020	Quantitative Biomedical Sciences, TA Fellowship 100% effort	Levy J (PI)	$5,000
2021	Single Cell Genomics Core Visium Pilot Funds	Levy J (Co-PI)	$10,000

Pending:

Year	Title	Role	Amount
2022	Opening DOORS to Low-Cost Library Synthesis for CRISPR Off-Target Screening	Levy J (PI)	$40,000
2022	Deep Learning Histomorphological Choriocarcinoma Triage System (American Cancer Society)	Levy J (PI)	$30,000
2022	Development of a crowd peer review platform for transdisciplinary computational research	Levy J (Co-PI)	$40,000
2021	Advancing Clinical Translational Science through Validation of Emerging Diagnostic Artificial Intelligence Technologies	Levy J (PI)	$1,250,000
2022	Machine Learning, NLP, Suicide Prevention	Levis M (Co-I)	$18,000 (directs)
2022	Predicting colon cancer metastasis through spatial molecular characterization of the tumor immune microenvironment	Levy J (PI)	$1,250,000
2022	Evaluating choriocarcinoma risk factors in first trimester miscarriages using quantitative deep learning histological assessments of abnormal villous morphology	Levy J (PI)	$30,000
2022	Machine Learning Strategies for Predicting the Risk of Suicide Using Clinical Note Text	Levy J (Site-PI)	$2,000,000

2022	Emerging Diagnostic and Investigative Technologies (EDIT) AI: a virtual summer program for underserved high school students exploring artificial intelligence applications in medicine		
		Levy J (PI)	$1,250,000
2022	Pre-operative Stereotactic Radiosurgery (SRS) for Brain Metastases with or without Hyperbaric Oxygen (HBO): an Exploratory Molecular Marker Analysis	Levy J (Co-PI)	$60,000
2022	Impact of Phenols on Healthy Placental Growth	Levy J (Site-PI)	$3,000,000

XIV. PROGRAM DEVELOPMENT:

Aug 2018 – present:
EDIT (Emerging Diagnostic and Investigative Technologies)
Research Program, Department of Pathology and Laboratory Medicine, DHMC, Lebanon, NH
- Investigating emerging diagnostic deep learning technologies: molecular, histopathological, text, and image (Founder EDITor)
- Collaborating with other EDITors to automate diagnostic technologies
- User-centered design and validation.
- Machine-learning arm co-lead, whole genome sequencing
- Internship program co-head: conception, mentorship, skill development

XV. ENTREPRENEURIAL ACTIVITIES:
Related to the design of deep learning techniques for the analysis of whole slide images and high-resolution anorectal manometry devices (ongoing).
- I-Corps Incubator
- Dartmouth Innovations Accelerator
- DRIVEN Accelerator
- Dartmouth Entrepreneurs Startup Competition Finalists
- 3 Patents Pending

XVI. MAJOR COMMITTEE ASSIGNMENTS:
International: N/A

National: N/A

Institutional:
2018-2021	Synergy Biostatistics Consultant, Geisel School of Medicine at Dartmouth, Hanover, NH
2019-2021	Burroughs Wellcome Fund Fellow, Geisel School of Medicine at Dartmouth, Hanover, NH
2018-2020	Graduate Student Council Executive, Dartmouth College, Hanover, NH
2021-	Quantitative Biomedical Sciences Ad-Hoc Reviewer Master's Admission Committee, Hanover, NH
2022-	Biostatistics and Bioinformatics Shared Resource Faculty, Hanover, NH
2022-	Bioinformatics Curriculum Committee, Quantitative Biomedical Sciences, Hanover, NH

XVII. MEMBERSHIPS, OFFICE, AND COMMITTEE ASSIGNMENTS IN PROFESSIONAL SOCIETIES:
2017-2019	Artificial Intelligence (AI) Enthusiast Club, Walnut Creek, CA, Founder
2018-2019	QuantBlitz Data Science Club, Hanover, NH, Member
2019	Epidemiology Students Club, Hanover, NH, Member
2020-	

2021   Natural Language Processing (NLP) Consultant, Department of Psychiatry, Hanover, NH
2019-
2020   International Society for Computational Biology and Bioinformatics
2022   Association for Computing Machinery
2021-   Quantitative Biomedical Sciences Ad-Hoc Reviewer Master's Admission Committee, Hanover, NH
2022-   Norris Cotton Cancer Center, Cancer Population Sciences
2022-   Norris Cotton Cancer Center, Biostatistics and Bioinformatics Shared Resource
2022-   Quantitative Biomedical Sciences Bioinformatics Curriculum Committee, Hanover, NH

XVIII. EDITORIAL BOARDS:

2021-   Frontiers in Medical Technology
present   Co-Guest Editor
2021-   Cancers
present   Co-Guest Editor

XIX. JOURNAL REFEREE ACTIVITY:

Crohn's and Colitis 360 (x1)
Pacific Symposium on Biocomputing (x3)
BMC Biomedical Medical Research Methodology (x1)
Laboratory Investigation (x2)
PLOS Computational Biology (x3)
Cancer Cytopathology (x1)
Computational Statistics & Data Analysis (x1)
Computerized Medical Imaging and Graphics (x2)
Computer Methods and Programs in Biomedicine (x2)
Clinical Epigenetics (x2)
Journal of Translational Medicine (x1)
Neural Processing Letters (x1)
All Life (x1)
BMC Medical Informatics (x1)
BMC Bioinformatics (x2)
The Lancet (x1)
Nature Communications (x3)
Nature Scientific Reports (x2)
IEEE Journal of Biomedical and Health Informatics (x1)
Bioinformatics (x1)
Frontiers in Education (x2)
Cancers (x2)
Annals of Applied Statistics (x1)
Journal of Medical Artificial Intelligence (x1)
NAR Genomics and Bioinformatics (x1)

XX. AWARDS AND HONORS:

2015-2017   UC Berkeley, Dean's List (Fall 2015, Spring 2016)
            Honors (All Semesters); Highest Distinction; Cum. GPA: 3.97 / 4.0; Major GPA: 3.98 / 4.0

2020   Geisel School of Medicine at Dartmouth College
            Center for Quantitative Biology Travel Award $2,000

2020   BIOSTEC 2020 Comp2Clinic Workshop, Best Paper

2021   Modern Pathology Article Top Pick of January 2021

2022   Guarini School of Graduate and Advanced Studies
                Hannah Croasdale Award for academic excellence $1,000

XXI. INVITED PRESENTATIONS:
 (*) those presentations to which an individual invitation was extended
 (#) those presentations that were meetings where a poster/talk, was presented at a large society meeting)
 (^) if the talk/presentation was applicable as a CME activity.

International:
2020   Preliminary Evaluation of Generative Image Translation Technologies for Histopathology
        Podium presentation (Best Paper Award), Biomedical Engineering Systems and Technologies
        (Biostec) 2020 C2C Workshop, Valletta, Malta

2022   Federated Data Networks, *SIGAPP ACM 2022*, Virtual Conference

2022   Multimodal Learning, *SIGAPP ACM 2022*, Virtual Conference

2022   Graph Neural Networks for Lymphocyte Prediction, GeoMedIA Workshop, *MICCAI*, Amsterdam

National
2017   Snapshots of genome evolution and population dynamics in the allopolyploid grass Brachypodium
        hybridum. Poster, American Society of Plant Biologists (ASPB), Honolulu, HI

2020   PathFlowAI: Scalable Digital Pathology
        Pacific Symposium Biocomputing 2020, Kona, HI

2021   Topological Feature Extraction for Whole Slide Images with Graph Neural Networks
        Podium Talk, Pacific Symposium Biocomputing 2021, Kona, HI

2021   Digital spatial profiling identifies novel biomarkers for locally invasive tumors, *Association for
        Molecular Pathology 2021,* Virtual

2022   Mixed effects machine learning on spatially localized immuno-oncology markers for colon
        metastasis prediction
        Pacific Symposium Biocomputing 2022, Kona, HI

Local/Regional
2018   Where are Your Bug's Genes and What do They Do? Workflow Automation and Machine Learning
        for Gene Annotation and Function. Zymergen, Emeryville, CA & Seattle, WA

2019   Machine Learning Analytics of Pancancer Methylation Microarray and RNA-sequencing Profiles at
        Susceptibility Loci. Poster, Celebration of Biomedical Research at Dartmouth (CBRaD), Hanover, NH

2019   MethylNet: A Modular Deep Learning Approach to DNA Methylation Prediction
        Quantitative Biomedical Sciences: (QBS) Retreat and NCCC Retreat, Hanover NH

2020   PathFlowAI: Scalable Digital Pathology
        Dartmouth-Hitchcock Retreat, Hanover NH

2020   Improving Data Representation Software for DNAm and Histopathology,
        Research in Progress, QBS, Hanover, NH

2020	Mortality Prediction from Satellite Imagery Burroughs Wellcome Fellowship, Hanover, NH
2020	Automating the Paris System Burroughs Wellcome Fellowship, Hanover, NH
2021	Opportunities for Machine Learning Research in Pathology and Dermatology Department of Dermatology, Hanover, NH
2021	Introduction to Neural Networks, Guest Lecture for QBS Class, Hanover NH
2021	Application of Hierarchical Bayesian Methods for Medical Artificial Intelligence, Guest Lecture for QBS Class, Hanover NH
2021	Uncertainty in Disease Staging, Research in Progress, QBS, Hanover NH
2021	Emerging Diagnostic and Investigative Technologies: Validation of Deep Learning Technologies for DNA Methylation and Histopathology, Thesis Seminar Talk, Hanover NH
2021	Emerging Machine Learning Methods in Digital Pathology, EDIT Seminar Talk, Hanover NH
2021	Opportunities for Machine Learning Research in Pathology, QBS, Hanover NH
2021	R Software Packaging, Guest Lecture for QBS Class, Hanover NH
2021	Research Overview, Department of Epidemiology, Hanover NH
2021	Mixed effects machine learning on spatially localized immuno-oncology markers for colon metastasis prediction, NCCC Retreat, Lebanon NH
2022	Introduction to Machine Learning and Research Opportunities in Pathology and Dermatology, Geisel School of Medicine Medical Student AI Interest Group, Lebanon NH
2022	Rapid 100% Margin Assessment through AI in the Surgical Pathology Setting, Melanoma Retreat, DHMC, Lebanon NH
2022	EDIT Machine Learning Internship Program, Dermatology Research Night, DHMC, Lebanon NH
2022	Introduction to Neural Networks, Guest Lecture for QBS177 Class, Hanover NH
2022	Advancing Clinical Translational Sciences through Validation of Emerging Artificial Intelligence Technologies, Cancer Population Sciences, Hanover NH
2022	Medical AI Opportunities, Oakland Tech, Oakland CA
2022	Artificial Intelligence @ Dartmouth Health, Guest Lecture for ENGS 56, Thayer School of Engineering, Hanover NH
2022	Virtual QBS Master's Capstone Conference, QBS, Hanover NH
2022	Virtual EDIT AI Conference, DHMC, Hanover NH

2022   EDIT: Advancing Clinical Translational Sciences through Validation of Emerging AI Technologies, QBS, Hanover NH

XXII. BIBLIOGRAPHY:

A. Peer-reviewed publications in print or other media

<u>**PhD Thesis:**</u>
1.   **Levy J.** Emerging Diagnostic and Investigative Technologies: Validation of Deep Learning Technologies for DNA Methylation and Histopathology. 2021

<u>**Reviews:**</u>
1.   **Levy J**, Vaickus L. Applications of AI in Anatomic Pathology. *Advances in Molecular Pathology,* 2021

<u>**Book Chapters**</u>:
1.   **Levy J**, Vaickus L. Applications of AI in Molecular Pathology (Chapter Proofing)

<u>**Original articles:**</u>
1.   **Co-first:** *Gordon SP, * **Levy J**, Vogel JP. PolyCRACKER, a robust method for the unsupervised partitioning of polyploid subgenomes by signatures of repetitive DNA evolution. BMC Genomics.

2.   **Levy J**, Titus A, Salas L, Christensen B. PyMethylProcess - convenient high-throughput preprocessing workflow for DNA methylation data. Bioinformatics. 2019.

3.   **Levy J**, Titus AJ, Petersen CL, Chen Y, Salas LA, Christensen BC. MethylNet: An Automated and Modular Deep Learning Approach for DNA Methylation Analysis. BMC Bioinformatics. 2020.

4.   **Levy J**, Salas LA, Christensen BC, Sriharan A, Vaickus LJ. PathFlowAI: A High-Throughput Workflow for Preprocessing, Deep Learning and Interpretation in Digital Pathology. Pacific Symposium on Biocomputing, 2020;25:403–14.

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10. **Levy J**, et. al. Journey across Epidemiology's Third Variables: An Anesthesiologist's Guide for Successfully Navigating Confounding, Mediation, and Effect Modification. BMJ RAPM, 2021.

11. **Levy J**, Lebeaux, R. M., Hoen, A. G., et al. Using Satellite Images and Deep Learning to Identify Associations Between County-Level Mortality and Residential Neighborhood Features Proximal to

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Manuscripts in review:
1. **Levy J**, et. al. Pathflow-MixMatch for Whole Slide Image Registration: An Investigation of a Segment-Based Scalable Image Registration Method

2. **Levy J**, et. al. GCN4R: Latent Position of Actors in Social Networks with Graph Neural Networks

3. **Levy J**, Christensen C, Vaickus L, Shah E. A Deep Learning Method for Prediction of Abnormal Anorectal Manometry Exams

4. **Levy J**, Bobak C, et. al. Bridge Category Models: Development of Bayesian Modelling Procedures to Account for Bridge Ordinal Ratings for Disease Staging

5. **Levy J**, Bobak C, et. al. Application of Hierarchical Bayesian Bridge Modeling Approaches for Estimating Inter-Rater Variability in Fibrosis Staging

6. **Levy J**, Bobak C, et. al. An Improvement to the Virtual Trichrome Assessment through Bridge Category Models

7. **Levy J**, LeBoeuf M, Christensen C, Vaickus L. ArcticAI: A Deep Learning Platform for Rapid and Accurate Histological Assessment of Intraoperative Tumor Margins

8. McNutt B, …, **Levy J**. Federated Learning Working Group

9. Lindqwister A, …, **Levy J**. AI-RADS: Successes and Challenges of a Novel Artificial Intelligence Curriculum for Radiologists Across Different Delivery Formats

10. Farhadi F, …, **Levy J**. Applications of Artificial Intelligence in Orthopaedic Surgery

11. **Levy J**, LeBoeuf M, Christensen C, Vaickus L. ArcticAI: A Deep Learning Platform for Rapid and Accurate Histological Assessment of Intraoperative Tumor Margins

12. **Levy J**, et. al. AI, Bioinformatics and Pathology: Emerging Trends Part 1

13. **Levy J**, et. al. AI, Bioinformatics and Pathology: Emerging Trends Part 2

14. **Levy J**, et. al. PathologyOutlines Virtual Staining

15. Bobak C, …, **Levy J**, et. al.. GRANDPA: GeneRAtive Networks using Degree and Property Augmentation for the simulation and generation of privacy-preserving healthcare networks

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18. Levis M, **Levy J**, et. al. Machine Learning Modeling to Predict Suicide Amongst Veterans, Matched

19. Kerr D, Goyette E, **Levy J**, et. al. Mesenchymal Molecular Assessment

20. Farrel K, **Levy J**, et. al. Vaginal Birth after Cesarean: Adoption of a Regional Guideline

21. Kranyk A, … **Levy J,** et al. Alopecia Areata and Thyroid Screening in Down Syndrome: Leveraging Epic Cosmos Dataset

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1. **Levy J**, et. al. HistoBayes: An Interactive Web Application for Bayesian Deep Learning on Histopathology, with Applications in Cytopathology
2. **Levy J**, et. al. Hyperbolic MethylMaps: Hyperbolic Embeddings Pseudotime Bulk DNA Methylation
3. **Levy J**, et. al. InteractMethylXtract: Random Forest Selected DNA Methylation Interactions
4. **Levy J**, Haudenschild C, et. al. MetaCRACKER: Deep Clustering of Metagenomic Reads
5. **Levy J**, Christensen C, Vaickus L. Large-Scale Prospective Validation of the AutoParis System
6. **Levy J**, Christensen C, Vaickus L. Bladder Cancer Recurrence
7. **Levy J**, LeBoeuf M, Christensen C, Vaickus L. Quality Assessment Method
8. **Levy J**, LeBoeuf M, Christensen C, Vaickus L. SCC
9. Chacko R***, Levy J***, LeBoeuf M. ArcticAI Efficiency
10. **Levy J**, Christensen C, Vaickus L, Shah E. Multicenter Prospective Validation of Anorectal Manometry AI Technologies
11. **Levy J** *, Ratna S*, et al. PyNuclei: A Software Framework for Nuclei Segmentation
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13. **Levy J**, Glaser A, et. al. DNA Methylation Brain Cell-Type Adjustment and Meta-Analysis Reveals Important Markers of Huntington's Disease

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17. **Levy J**, et. al. PathologyOutlines Graph Neural Networks
18. **Levy J**, et. al. PathologyOutlines Cytopathology
19. **Levy J**, et. al. PathologyOutlines Artificial Intelligence
20. **Levy J**, et. al. PathologyOutlines Molecular Pathology
21. **Levy J**, et. al. Stress Test
22. Anderson E, …, **Levy J**. Product of Conception Assessment
23. Cronin T, …, **Levy J**. Placenta Review
24. Pietrowicz S, …, **Levy J**. EDIT AI
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31. Gilbert-Diamond A, …, **Levy J**. Merkel Cell
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35. McOsker S, …, **Levy J**. Data Valuation
36. Kamau U, …, **Levy J**. DTM
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40. Zhao B, …, **Levy J.** BART Rare Event
41. Lu Y, …, **Levy J**. MGQC
42. Lu Y, …, **Levy J**. Malignant Cell
43. Hamilton R, …, **Levy J**. Dendrite
44. Cheng M, …, **Levy J**. Hirschsprung's disease
45. Suvarna A, …, **Levy J**. NERF #1
46. Suvarna A, …, **Levy J**. NERF #2
47. Fatemi M, …, **Levy J**. Spatial #1
48. Fatemi M, …, **Levy J**. Spatial #2
49. Sharma C, …, **Levy J**. Spatial #3
50. Hart S, …, **Levy J**. DNAm Colon
51. McNutt B, …, **Levy J**. Federated Learning Working Group for Pathology
52. McNutt B, …, **Levy J**. HistoCrypt: A Federated Learning Platform for Pathology
53. Gullet J, …, **Levy J**. Hierarchical Bayesian Analyses in Pathology
54. Ahzer Z, …, **Levy J**. Multimodal
55. Ahzer Z, …, **Levy J**. Spatial pretrain
56. Ratna S, …, **Levy J**. Stage GNN
57. Ramwala O, …, **Levy J**. Virtual GNN
58. Zavras J, …, **Levy J.** Impact of Stain Normalization on Deep Learning Models
59. Zhang E, …, **Levy J**. Green Ink Imputation with Graph Neural Networks
60. Greenburg J, …, **Levy J**. NLP Application to Detect Hospital Underbilling
61. Greenburg J, …, **Levy J**. Pressure Injury v2
62. Zheng Z, **Levy J**, et. al. Cell Type Independent Clock
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66. Levis M, **Levy J**, et. al. DTM
67. Emeny R, …, **Levy J**, et. al. Burbank Study
68. Satti K, …, **Levy J**, et. al. Inflammatory Markers Predictive of Changes in BMI
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70. Satti K, …, **Levy J**, et. al. BMI, Microbiome, T Cell Study
71. Carter J, …, **Levy J**, et. al. SCC
72. Kerr D, Goyette E, **Levy J**, et. al. Decalcification Protocol with Optimal Timing and Maximal Tissue Preservation for High-Quality Histologic Examination and Molecular Analysis
73. Kerr D, Goyette E, **Levy J**, et. al. Digital Spatial Profiling Dupuytren
74. Romero A**, Levy J,** et. al. Platelets
75. Hamilton R, …, **Levy J**. AutoML
76. Dunkle A, **Levy J**, et. al. Influenza Test Positivity Rates From 2019-2020 with the Onset of Social Distancing Due To COVID
77. Glass R, **Levy J**, et. al. Comparing NC Ratios between Eyeball and Diameter-Based Measurements
78. Greene C, …, **Levy J**. Opportunities and obstacles for deep learning in biology and medicine, 2nd update.

Letters to the Editor: N/A

B. Other scholarly work in print or other media including editorially-reviewed publications (e.g., Op-Ed pieces, Letters to the Editor), print resources (e.g., workshops) and electronic resources (e.g., MOOCs, educational websites, modules, videos, virtual patients): N/A

C. Abstracts:
   Presented at National Meetings:
   1. Glass R, **Levy J**, et. al. Atypia of Undetermined Significance in Thyroid Cytology: Nuclear and Architectural Atypia are Associated with Different Molecular Alterations and Risks of Malignancy (abstract)
   2. Glass R, **Levy J**, et. al. Utilizing molecular testing to improve the management of thyroid nodules with indeterminate cytology: an institutional experience (abstract)
   3. Copeland-Halperin L, … **Levy J,** … et. al. Oral Cancer Patients Undergoing Resection with Free Flap Reconstruction: Predictors of Gastrostomy Tube Placement, *STARS* 2021
   4. Stewart T, …, **Levy J**, … et. al. Predictors of Gastronomy Tube Placement for Patients Undergoing Resection of Head and Neck Cancer with Flap-based Reconstruction: Protocol for Systematic Review and Meta-Analysis. *ACSVT* 2021
   5. Copeland-Halperin L, …, **Levy J,** …, et.al. Indications for Gastrostomy Tube Placement in Oral Cancer Patients Undergoing Resection with Immediate Free Flap Reconstruction. *AHNS* 2021
   6. Copeland-Halperin L, …, **Levy J,** …, et.al. Does the Timing of Postoperative Showering Impact Infection and Complication Rates? *NESPRS* 2020
   7. Barney RE, Palisoul SM, **Levy J**, Vaickus LJ, Lin CC, Tsongalis GJ, Zanazzi G. Digital Spatial Profiling Identifies Novel Biomarkers for Locally Invasive Tumors. J Molec Diagn 2021;23, 1648 (TT31)
   8. Satti, K, **Levy, J**, et al. Effect of Vitamin D on the Relationship Between TNF-α and BMI. Pediatric Academic Societies (PAS) 2022 Meeting
   9. Jackson C, **Levy J**, Liu X, Vaickus L. Smartphone deployment of neural network Ki67 interpretation tool USCAP (2022)
   10. Levis M, **Levy J**, et al. Machine Learning and Natural Language Processing for Suicide Risk Prevention Amongst US Veterans (2022)

   Presented at Local Meetings:
   1. Farrel K, **Levy J**, et. al. Vaginal Birth After Cesarean Section in Northern New England: Assessing the Adoption and Impact of Regional Guidelines, Dartmouth Hitchcock Medical Center, Lebanon, NH

2. Catalan P, …, Gordon S, **Levy J**, et. al. Integrative Genomic Characterization of the Brachypodium Polyploid Model to Unravel Bases of Success of Polyploidy in Flowering Plants, DOE JGI, Berkeley, CA
3. Chen Y, **Levy J**, et. al., Machine Learning Analytics of Pan-cancer Methylation Microarray and RNA-sequencing Profiles at Susceptibility Loci, CBRaD 2019
4. Jackson C, **Levy J**, Liu X, Vaickus L. Smartphone deployment of neural network Ki67 interpretation tool Mass General Brigham Research Poster (2022)

Other:
1. Chen Y, … **Levy J**, et.al. Radiomics analysis on the molecular targeted fluorescence image provides precise tumor mapping for surgery guidance of head and neck cancer. Frontiers in Medical Technology 2022.

D. Conference Session Chair:

Conference Sessions in Preparation / Under Review:
1. Carly A. Bobak, Courtney T. Schiebout, Sean McOsker, Yifan Zhao, Samuel Lefkowitz, Brady Hunt, Derek Williamson, Joseph Romano, Kristine A. Giffin, Christian Darabos, **Joshua Levy**, Jason H. Moore, Dennis P. Wall. *HUMAN INTRIGUE: BIG QUESTIONS WITH BIG DATA*
2. Samuel Lefkowitz, **Joshua Levy**, Carly A. Bobak. Biological and Medical Applications of Networks and Graph Theory
3. Carly A. Bobak, Courtney T. Schiebout, Sean McOsker, Yifan Zhao, Samuel Lefkowitz, Brady Hunt, Kristine A. Giffin, **Joshua Levy**, and Christian Darabos. STORYTELLING WITH DATA SCIENCE

XXIII. Personal Statement:

My formal background and training are in Physics and Quantitative Biomedical Sciences, the latter of which is an interdisciplinary data science discipline at the intersection of Epidemiology, Biostatistics and Bioinformatics. My experience in Physics motivated me to think abstractly about how information could be represented using n-dimensional objects, which has been of great benefit as my research shifted towards applied machine learning. Prior to my PhD training, I learned to develop, implement and deploy over one hundred sophisticated reproducible, containerized genomics and bioinformatics workflows at scale in High Performance Computing (HPC) computing environments as a software developer/engineer at both the Lawrence Berkeley National Labs and Zymergen, which instilled in me a mindset of doing public good through high throughput computations. My motivations for my recent career aspirations originated through my work in the San Francisco Department of Public Health (SFDPH), where I witnessed first-hand some of the many challenges associated with implementing new digital technologies in a healthcare setting which was, at times, averse to change and frustrations on behalf of the stakeholders. This inspired me to think more critically about how to engage stakeholders, and now that I am in a position to develop and implement these novel biomedical technologies, I have taken these principles to heart by directly integrating with the stakeholders which I aim to benefit. I served as a Burroughs Wellcome Fellow, which enabled me to build closer relationships with the Department of Pathology. Currently, I serve as an Assistant Professor of the Departments of Pathology and Laboratory Medicine, and Dermatology, an Adjunct Professor of Epidemiology, and faculty in the Quantitative Biomedical Sciences Graduate program. I am one of the founders and the co-director of the Machine Learning arm of the Emerging Diagnostic and Investigative Technologies (EDIT) program. My research group aims to justify the use of digital pathology technologies by developing and validating machine learning technologies and envisioning how they would fit into the clinical workflow. As such, I am in an optimal position to develop and implement digital pathology technologies through effective stakeholder engagement.

To this end, my doctoral work centered around creating standardized, high throughput, open-source software to enable domain experts to extract key insights from two high dimensional data types, DNA Methylation (DNAm) and histopathological data, while validating emerging technologies which could provide immediate benefit to the end user, such as processes to virtually stain tissue to obviate the need for chemical tissue staining. My research group's aims extend beyond these original objectives to include new aims such as: 1) integration of hierarchical Bayesian statistical methodologies with machine learning technologies to provide fair assessments of digital pathology technologies, 2) further methods development and validation of

spatial omics technologies, with 3) applications to further understanding of disease pathogenesis and epidemiology. My lab is also developing health informatics technologies that integrate multiple biomedical data modalities, from natural language processing to temporally captured diagnostic codes and lab measurements.

I am committed to the vision of creating a self-sufficient digital pathology program in EDIT through building an independent research lab composed of researchers with diverse, interdisciplinary skillsets. My mentorship experience to date includes launching a year-round internship program which has run successfully for three years. I have directly mentored 40 high school, 10 undergraduate, 9 Master's, 5 medical students, and 4 pathology resident fellows, and am taking on PhD rotation students (3 rotation students and 1 MD PhD student).

I am a member of the Cancer Population Sciences Program, which prides itself on interdisciplinary collaboration amongst basic and physician science researchers, broadly covering the identification of precancerous exposures and somatic alterations elucidated through environmental and molecular epidemiology, using data from translational research to inform our understanding of disease processes and iteratively refine translational work, to the implementation and dissemination of key findings. The research aims of my lab are optimally aligned with these pursuits– my lab is chiefly focused on tackling public health challenges through high throughput computation and building an understanding of which technologies are optimally aligned with stakeholders and thus likely to have a positive impact on the greater community.

Updated by:

Date: