

**Geisel School of Medicine at Dartmouth  
Dartmouth-Hitchcock Medical Center  
CURRICULUM VITAE**

**NAME:** Joshua Levy PhD

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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

**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-<br>Jun 2016 | CiBER lab, Berkeley, CA<br>• Agama Lizard Turns: Matlab and ProAnalyst analysis of lizard turning tendencies   | Biomechanics Research Assistant |
| Jun 2016-<br>May 2020   | Lawrence Berkeley National Lab,<br>JGI Affiliate, Berkeley, CA<br>• Novel computational methods elucidate quality biofuels: pangenome phylogenetics, genomics workflows, metagenomics binning, machine learning via large-scale, automated, supercomputer pipelines (Python/Nextflow)                                | Software Developer              |
| Jun - Dec 2017          | San Francisco Department of Public Health: Tuberculosis Control,<br>San Francisco, CA<br>• Evaluated patient data integrity and transition to electronic health records.   | Public Service Aide             |
| May-Aug 2018            | Zymergen, Emeryville, CA<br>• Constructed many different HPC AWS bioinformatics pipelines using CWL Docker, and Seven Bridges, storing results in SQL databases.<br>• Used Convolutional Neural Networks and hyperbolic embeddings to explore relationships between gene and function for discovery of biomaterials. | Software Engineer Intern        |
| Jan 2020-<br>present    | ArcticAI, Hanover, NH<br>• Developing core technology, IP, and vision for intraoperative medical device  | Chief Technical Officer         |
| Oct 2020-<br>present    | Veterans Affairs Healthcare System,<br>White River Junction, VT<br>• Consulting on machine learning-based natural language processing software for suicide risk prediction   | Statistical Consultant          |

**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 | 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<br>Intra-institutional digital stain preference<br>Evaluation AI Technologies |
| 2020-Present | Jason McFadden                      | Stain Preference  |
| 2021         | Osezele Okoruwa                     | Medical Informatics   |
| 2021-2022    | Jean Yuan                           | Medical Informatics   |
| 2021-2022    | Daniel Dong                         | Data Evaluation   |
| 2022-Present | William Chen                        | Spatial Profiling   |
| 2022-Present | John Zavras                         | DNA Methylation   |
| 2022-Present | Sabin Hart                          |   |

**Middlebury College**

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

**University of Michigan**

|              |             |                     |
|--------------|-------------|---------------------|
| 2021-Present | Carly Miles | 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               |

**C. MEDICAL STUDENTS:**

|              |                        |                           |                           |
|--------------|------------------------|---------------------------|---------------------------|
| 2020-2021    | Eren Veziroglu         | Medical Student           | Digital Spatial Profiling |
| 2020-2021    | Mustafa Nasir Moin     | Prospective Medical       | Digital Spatial Profiling |
| 2021-Present | Marietta Montivero     | Geisel MD PhD Student     | Surgical Excision         |
| 2022-Present | Raven Bennett          | Geisel MD Student         | Microbiome                |
| 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: N/A**

##### **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:**

|       |  |                   |                    |
|-------|--|-------------------|--------------------|
| 2021- | Prouty Grant <i>CRISPR Targeting of Merkel Cell Polyomavirus</i>   | Levy J (Co-PI)    | \$50,000           |
| 2020- | Prouty Grant <i>Validation of In-Vivo Imaging (20%)</i>  | LeBeouf M (Co-PI) | \$50,000           |
| 2021- | Sun Damage Reversal Therapies (COBRE Pilot)  | Levy J (PI)       | \$50,000           |
| 2022- | Dartmouth Hitchcock ORO Capital Investment, <i>Pathology Advanced Computational Environment</i>                        | 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  | Hitchcock Foundation Pilot, Komal Satti <i>How Obesity Influences the Immune Repertoire in Children. A Pilot Study</i> | Levy J (Co-I)     | \$40,000           |

##### **Past:**

|      |  |                |          |
|------|--|----------------|----------|
| 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,<br><i>QDP-Alpha</i> (33% effort)  | Levy J (Co-PI)    | \$160,000             |
| 2020            | Neukom Institute CompX<br><i>Virtual Flow Cytometry</i> (20% effort)  | Sriharan A (Co-I) | \$40,000              |
| 2020            | Neukom Institute CompX<br><i>Virtual Laboratory for Students</i> (95% effort)   | Levy J (Co-PI)    | \$25,000              |
| 2020            | Quantitative Biomedical Sciences, TA Fellowship<br>100% effort  | Levy J (PI)       | \$5,000               |
| 2021            | Single Cell Genomics Core Visium Pilot Funds  | Levy J (Co-PI)    | \$10,000              |
| <b>Pending:</b> |   |                   |                       |
| 2022            | Opening DOORS to Low-Cost Library Synthesis for CRISPR<br>Off-Target Screening  | Levy J (PI)       | \$40,000              |
| 2022            | Deep Learning Histomorphological Choriocarcinoma Triage<br>System (American Cancer Society)   | Levy J (PI)       | \$30,000              |
| 2022            | Development of a crowd peer review platform for<br>transdisciplinary computational research   | Levy J (Co-PI)    | \$40,000              |
| 2021            | Advancing Clinical Translational Science through Validation of Emerging Diagnostic Artificial<br>Intelligence Technologies  | Levy J (PI)       | \$1,250,000           |
| 2022            | TBD   | Levis M (Co-I)    | \$18,000<br>(directs) |
| 2022            | Predicting colon cancer metastasis through spatial molecular characterization of the tumor immune<br>microenvironment   | Levy J (PI)       | \$1,250,000           |
| 2022            | Evaluating choriocarcinoma risk factors in first trimester miscarriages using quantitative deep<br>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)  | \$1,600,000           |
| 2022            | Emerging Diagnostic and Investigative Technologies (EDIT) AI: a virtual summer program for<br>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<br>Oxygen (HBO): an Exploratory Molecular Marker Analysis                                   | Levy J (Co-PI)    | \$60,000              |

#### **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

#### **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

#### **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 (x1)  
 Nature Scientific Reports (x1)  
 IEEE Journal of Biomedical and Health Informatics (x1)  
 Bioinformatics (x1)  
 Frontiers in Education (x1)  
 Cancers (x1)  
 Annals of Applied Statistics (x1)  
 Journal of Medical Artificial Intelligence (x1)

## **XX. AWARDS AND HONORS:**

|           |   |         |
|-----------|---|---------|
| 2015-2017 | UC Berkeley, Dean's List (Fall 2015, Spring 2016)<br>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<br>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<br>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

### **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

**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

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### **A. Peer-reviewed publications in print or other media**

#### **PhD Thesis:**

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**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
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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
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**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
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### **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: