Advancing Public Health Laboratory Innovation through Strategic Data Science Internships

S. Patel[1], S. Mikorski[1], Chang Ho Yu[1], F. Nindo[1], T. Frez[1], A. Tripathy[2], G. Jastrzebski[3], A. Angelakis[4], A. Lidicker[5], V. Punnam[4], J. Chaurasia[6], A. Masoud[3], M. Sirimis[7], R. Finney[1], T. Kirn[1]

1. New Jersey Department of Health, Public Health and Environmental Laboratories, Ewing, NJ 08628; 2. Rutgers University, 3. New Jersey Institute of Technology (NJIT), 4. Boston University, 5. William Paterson University, 6. Northeastern University, 7. The College of New Jersey (TCNJ)

Summary

The New Jersey Department of Heatlh Public Health and Environmental Laboratories (PHEL) has developed a tiered system for Workforce Development that includes in-house training, client training, and student training. Student training comes in the form of internships, fellowships, and STEM for high school students.

By offering internships that bridge cutting-edge data science projects with real-world public health challenges, we create a learning environment that is stimulating to students and staff alike. Students bring the latest knowledge in computer science and apply it to public health challenges designed by our scientists.

This past year we have reached out to college computer science programs, both with our traditional college partners and with new ones within the State, and we continue to recruit summer interns from a variety of schools.

Key Initiatives

<u>AI-Powered Tools</u>
Parasite Detection – Computer vision for blood smear analysis
Malaria Diagnostics – Machine learning for enhanced diagnostics

<u>Enhancing Disease Surveillance</u>
H5N1 Flu Monitoring – Data-driven approaches for livestock surveillance
COVID-19 Genomic Data – Visualization tools for actionable insights

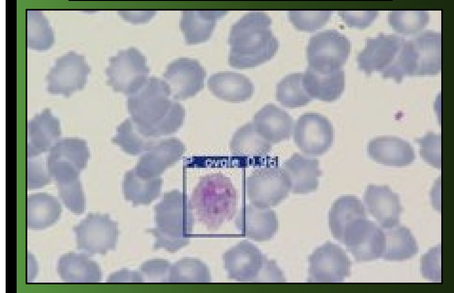
<u>Modernizing Laboratory Operations</u>
Automation of Sample Submissions – Streamlining workflows
Inventory & Maintenance – Optimizing lab operations for efficiency

<u>Workforce Development</u>
Training Needs Assessment – Building pathways for public health professionals in data science

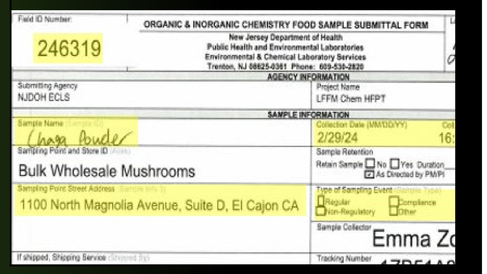
Projects

By developing AI tools for enhanced diagnostics, the program **improves disease detection and response times**. Data-driven surveillance efforts for H5N1 influenza and COVID-19 genomic data enable faster identification and containment of health threats. Modernizing laboratory operations through automation streamlines workflows, leads to quicker environmental and chemical analyses, while workforce development initiatives ensure public health professionals are equipped with essential data science skills.

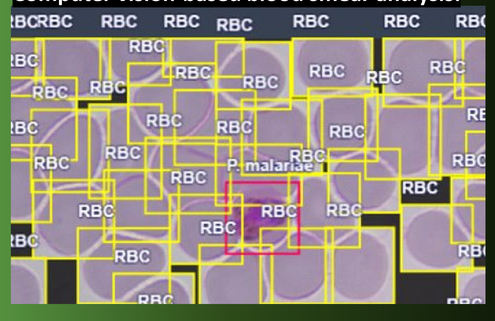
AI Powered Malaria Screener

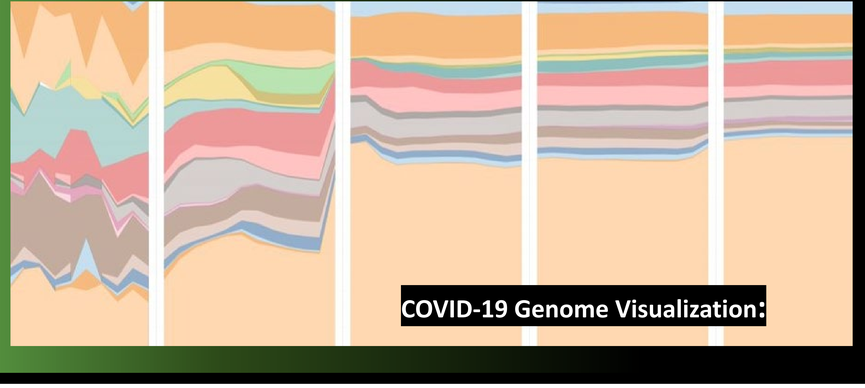


Automation of Sample Submissions



Computer vision-based blood smear analysis:





Interns

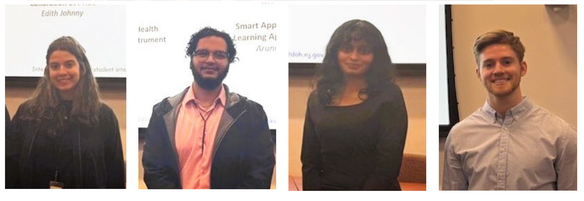
PHEL has recruited interns from the following universities:

- *William Paterson University*
- *Boston University*
- *Northeastern University*
- *The College of New Jersey*
- *New Jersey Institute of Technology (NJIT)*
- *Rutgers University*

Interns involved with these projects:

<u>(Interns 1-4)</u>
Ariana Lidicker
Aristea Angelakis
Varun Punnam
Jayesh Chaurasia

<u>(Interns 5-8)</u>
Mareya Sirimis
Abanoub Masoud
Arunima Tripathy
Gabriel Jastrzebski



Over the past three semesters, the program:
- Received 200 applications
- Hosted 20 interns

The projects provide interns with:
- Invaluable hands-on experience
- A deep understanding of the public health data lifecycle
- The skills to contribute meaningfully to future challenges.

Acknowledgements:
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