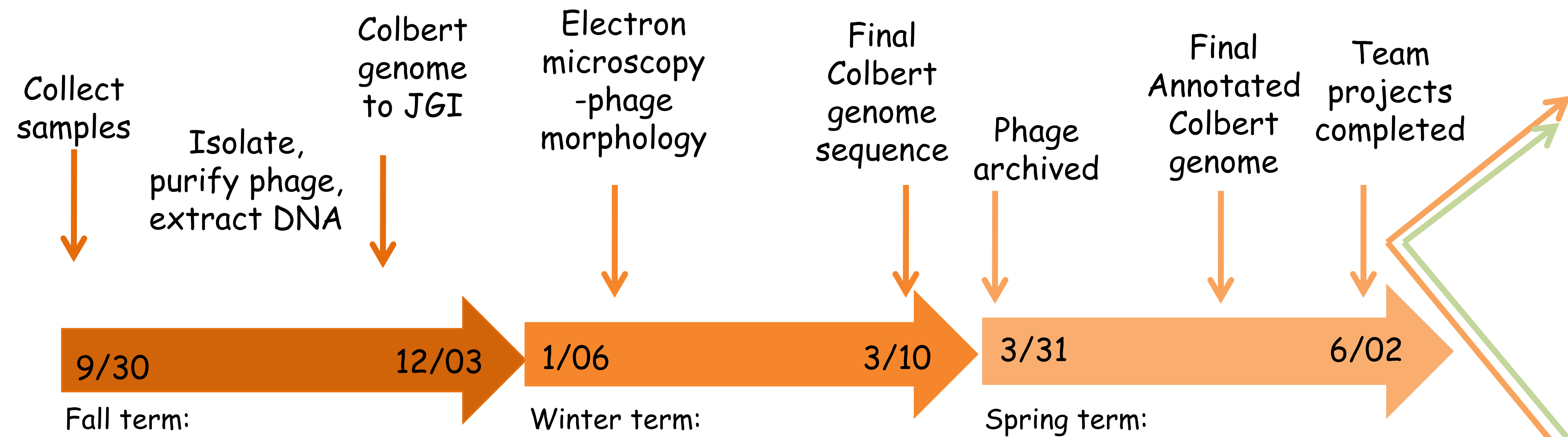


## Implementation of the Phage Genomics Laboratory

Our guiding principle motivating the implementation of the Phage Genomics laboratory (PGL) was to have students engage in a primary research experience early in their undergraduate experience.

- The PGL was one of two Honors laboratories associated with a large, year-long Introductory Biology course, Principles of Biology BI 211, 212 and 213.
- Freshman and sophomore Honors and at-risk students applied for the course and fourteen were accepted into the laboratory.

## Course timeline



- Fall term:**
  - Students were immersed into wet lab from the first day.
  - We started each session with short demonstrations and lectures to introduce techniques.
  - Students gave oral updates on their weekly experimental progress.
  - We provided lots of one-on-one and small group support until students became adept at the techniques and trouble-shooting their own problems.
- Winter term:**
  - Introduced research papers for discussion and instruction.
  - Provided instruction on molecular biology and computational analysis because these topics were not part of their course sequence.
- Spring term:**
  - Each pair of students annotated segments of the genome.
  - The entire class held an annotation 'jamboree', modeled after those held for other genomes.
  - Following Phamerator-based gene family analysis, the students conducted a module on molecular evolutionary analysis for gene families in *Colbert* using Molecular Evolutionary Genetic Analysis (MEGA) and DNA Sequence Polymorphism (DnaSP) programs in order to assess whether natural selection might be acting on particular genes.
  - Students selected one of four possible task force teams and completed the projects.

- Conclusions:**
1. All of the students enrolled in the Fall term were retained through the entire 3-term sequence.
  2. A third of the students have entered research laboratories to pursue additional research experience. Two students were awarded competitive summer HHMI Research fellowships.
  3. Students performed well on the lecture examinations even though they had a different laboratory experience from other students in the class.
  4. Students worked hard, rolled with the punches, had a good sense of humor, were cooperative and collaborative. They were very productive.
  5. They communicate with each other outside of the laboratory and classroom setting.

## TEAM COMMUNICATION: Christine E. Schnitzler, Erica Puopolo, Tamsen Polley & Robert Bloom

Developed a web-site and blog to communicate with the OSU community about the phage genomics laboratory. The class page is housed on the Biology Program website

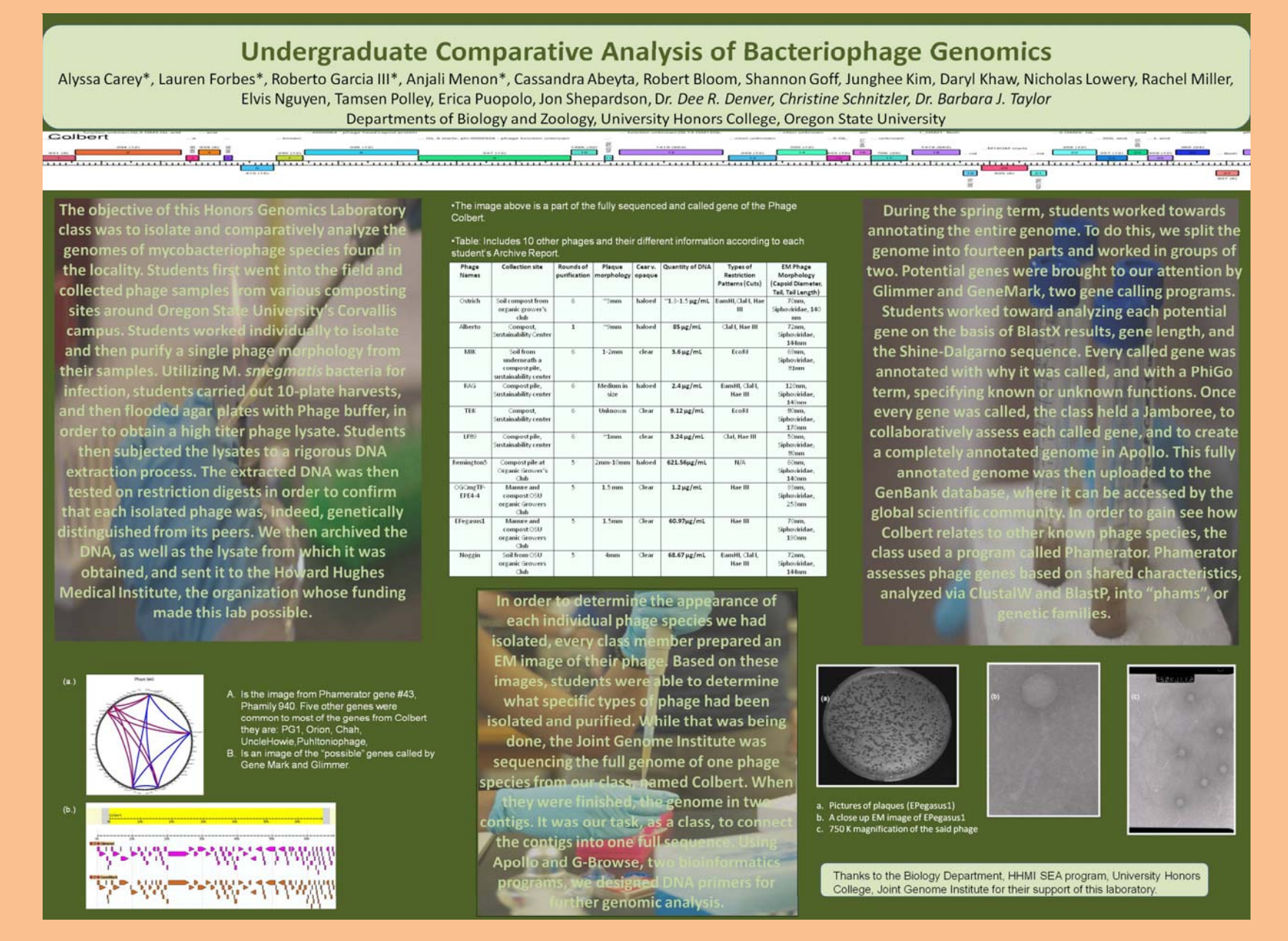


<http://biology.science.oregonstate.edu/courses/genomics-lab>

<http://osugenomicslaboratory.blogspot.com/>

## TEAM POSTER: Barbara J. Taylor, Alyssa Carey, Lauren Forbes, Roberto Garcia III & Anjali Menon

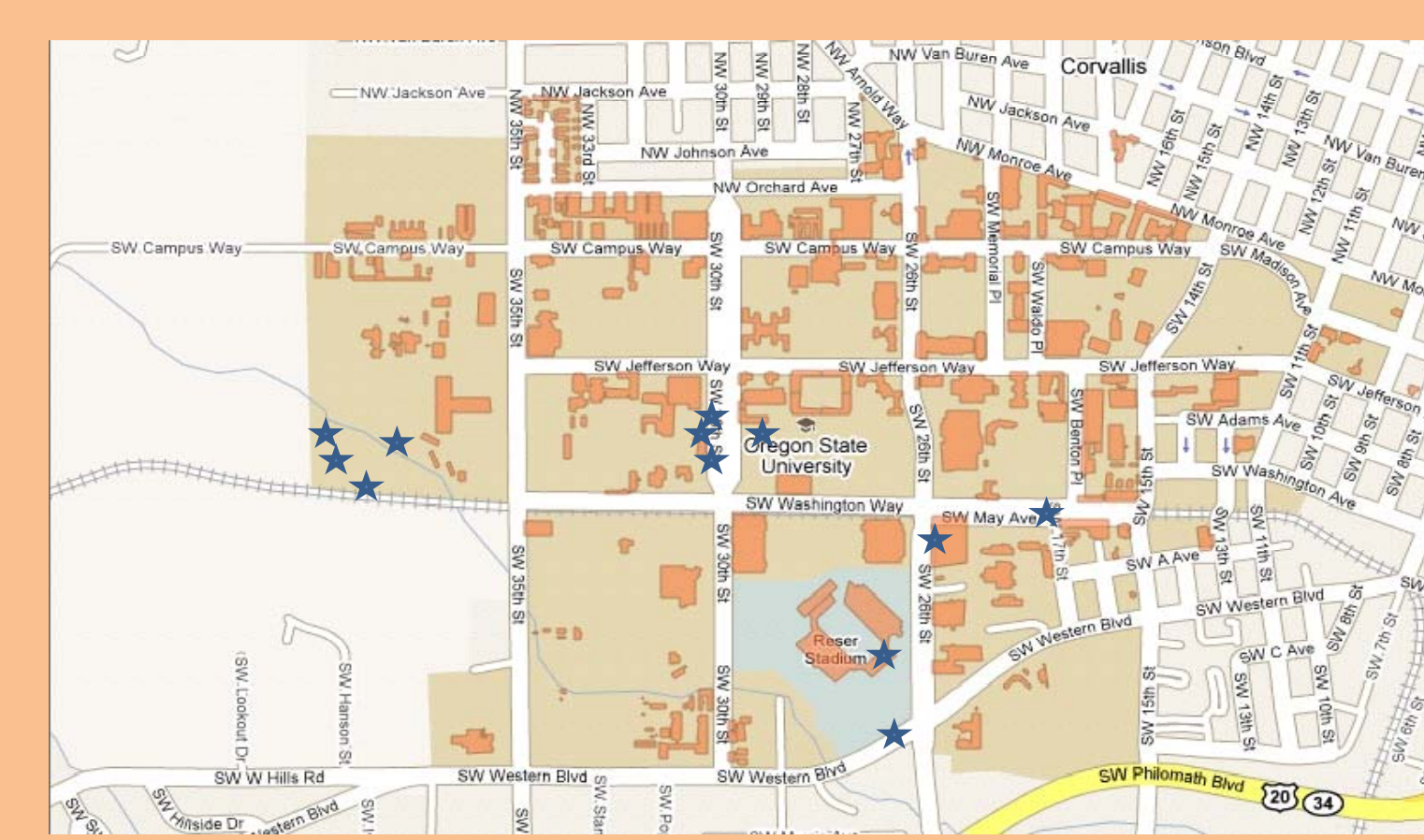
Created a poster illustrating the experiences and scientific accomplishments of the Phage genomics laboratory. It will be posted in Cordley Hall near the Biology Program Office.



## TEAM WETLAB: Andrew Woodall, Shannon Goff, Junghee Kim, Rachel Miller & Jon Shepardson

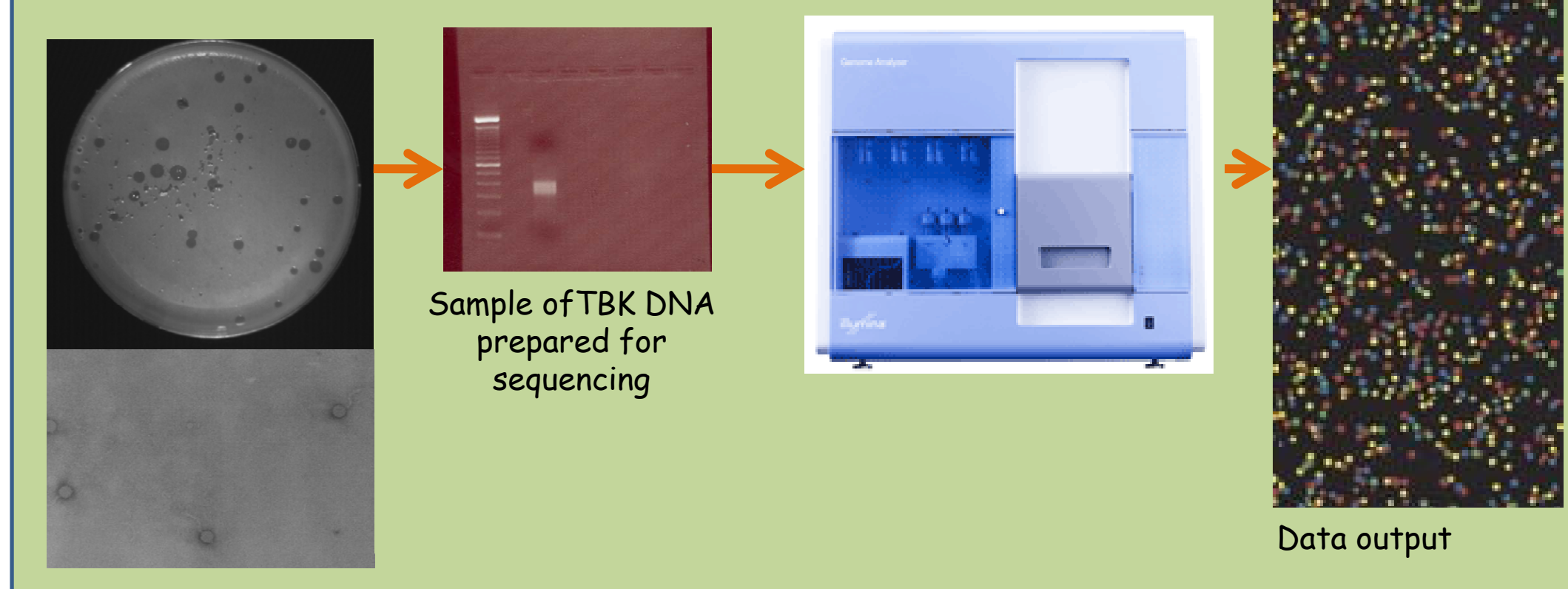
Identified new sites for phage isolation at OSU, tested out LB as a growth medium for mycobacteria.

Site Names	Plaque Presence	Spot Plate 1 (Junghee)	Spot Plate 2 (Jon)
Bloss Hall	Yes	No	Yes
ROTC	No	No	No
Library Pond	No	No	No
McNary Park	Yes	Yes	Yes
Sand Box	No	No	No
ALS	No	No	No
Greenhouse	Yes	Yes	Yes
Garden by Cordley	Yes	Yes	No
Sheep Run	Yes	Yes	Yes
Sheep Field	No	No	No
Puddle	Yes	Yes	Yes
Manure*	Yes	No	No



## TEAM GENOME: Dee R. Denver, Daryl Khaw, Nickolas Lowery & Elvis Nguyen

Successfully prepared a second genome, TBK, isolated by Daryl Khaw, for sequencing using Solexa high-throughput sequencing. Assisted by Dee Denver lab members- Dana Howe and Larry Wilhelm



See Dee R. Denver's presentation: Sequencing and Assembly of the Mycobacteriophage TBK Genome by Illumina IG Technology at Oregon State University

- Our profound thanks to the following individuals and programs:
- The OSU Biology Program, CoSINE, the University Honors College, Botany and Plant Pathology (Teresa Sawyer for EM) and the CGRB CSL facility for their support.
  - The Denver laboratory for their help and forbearance during the course.
  - The SEA/HHMI Director and current and former staff members: Tuajuanda Jordan, Lu Barker, Melvina Lewis, Kevin Bradley, Matt Conte, Andy Lee.
  - The Joint Genome Institute, Lynne A. Goodwin, Microbial Project Manager, for their willingness to stretch the limit.
  - The phage cartoons are courtesy of Tamsen Polley.

