

## Workshop

# Detection and Identification of Agricultural Pathogens using Next-Generation Sequencing Methods

Natalie Banks

Graduate Student, Murdoch University, CSIRO  
Ecosystem Sciences & NPBCRC

# Course Convenors



Dorota Porazinska  
Visiting Scientist  
CSIRO

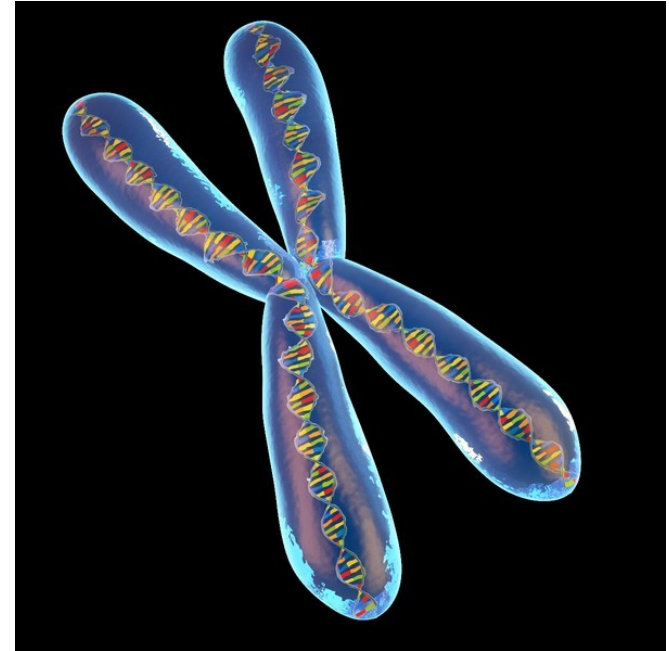
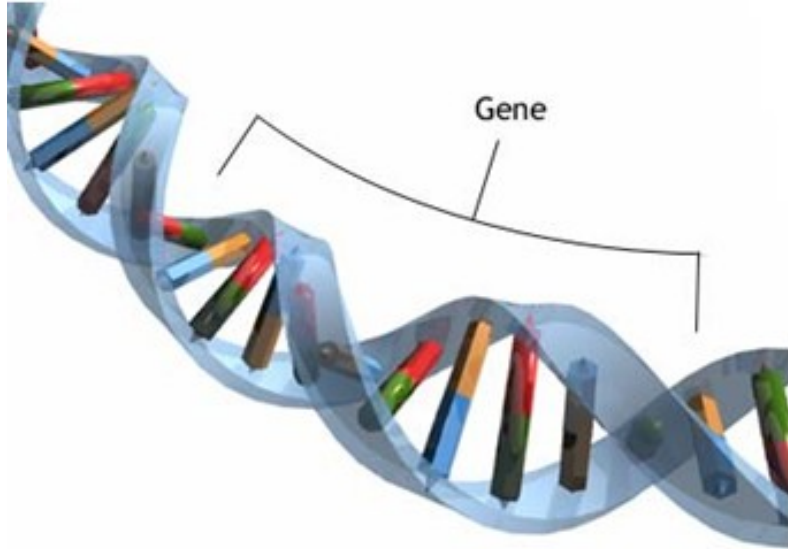


Mike Hodda  
Research Scientist  
CSIRO



Sunil Singh  
Graduate Student  
NPBCRC & CSIRO

# What is Next-Generation Sequencing?



<http://www.educ.ttu.edu/research/burkhart-center/story-archive/201Level 3>

<http://www.turbosquid.com/3d-models/chromosome-3d-model/669709>

## Sanger Method

## Next-Generation Sequencing (NGS)

# The workshop covered:

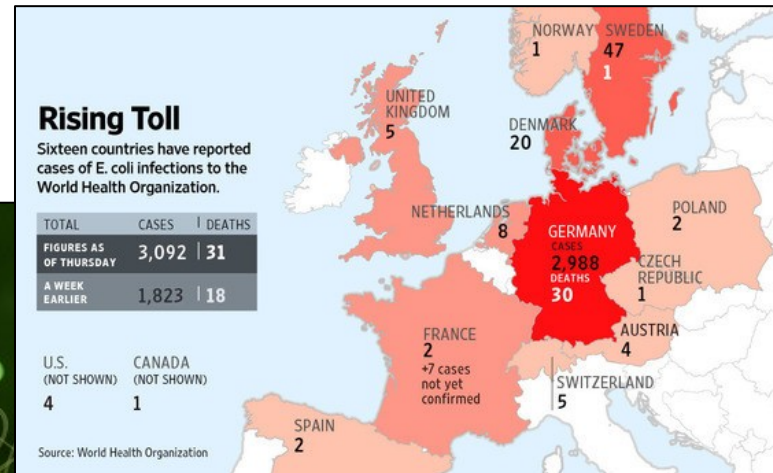
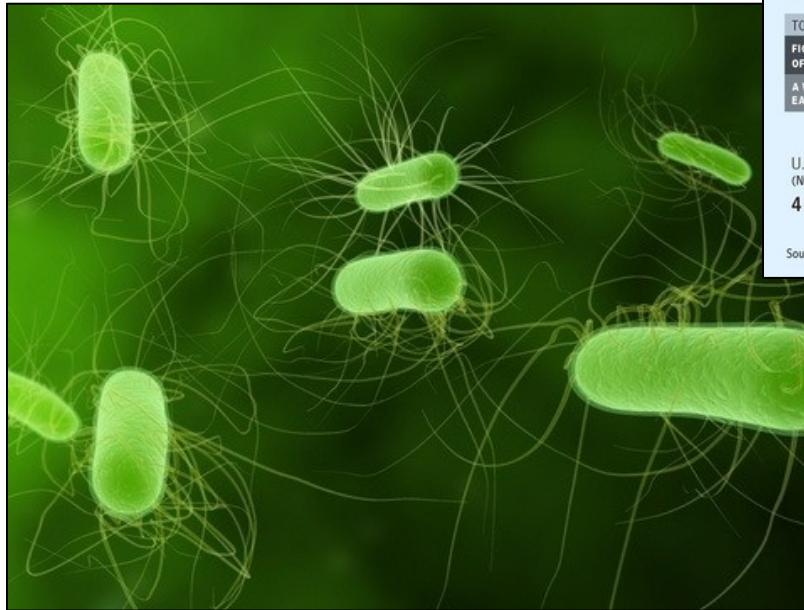
- The Need for NGS in Diagnostics- nematode case study
- NGS Methods vs. Current Methods
- Methodology in Detail- DNA laboratory discussions
- Data Output and Analysis
- Uses for NGS Technology

# Uses for NGS

- **Rapid Diagnostics**

# Uses for NGS

## ■ Rapid Diagnostics



<http://www.examiner.com/article/german-e-coli-traced-to-bean-sprouts-bacteria-contains-plague-dna>

<http://www.foodpoisonjournal.com/foodborne-illness-outbreaks/european-e-coli-o104-outbreak-update-16-dead-1243-sick-400-with-hus/#.UR1aUR2DkzE>

# Uses for NGS

- **Early detection and monitoring**

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[http://dna-barcoding.blogspot.com.au/2012\\_11\\_01\\_archive.html](http://dna-barcoding.blogspot.com.au/2012_11_01_archive.html)

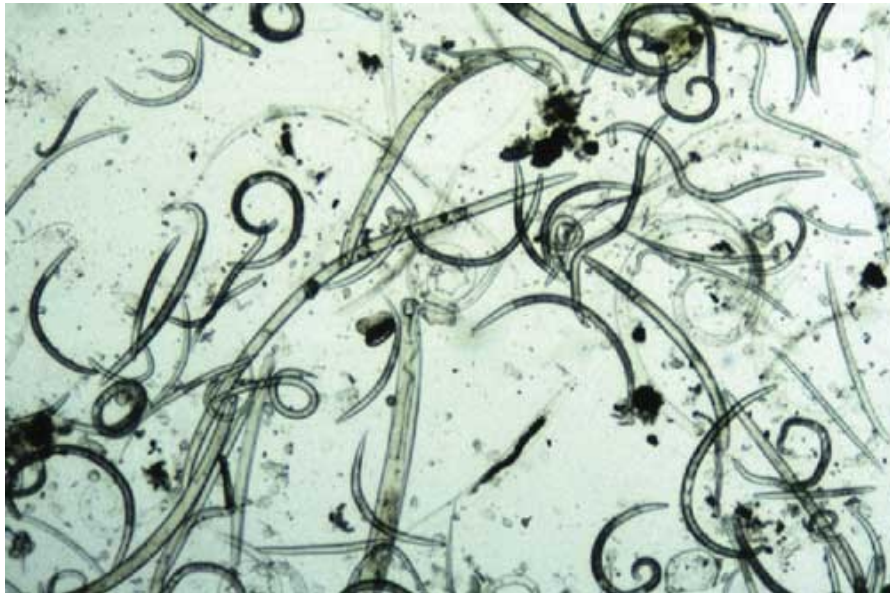


# Uses for NGS

- **Early detection and monitoring**



<http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=6033>



[http://dna-barcoding.blogspot.com.au/2012\\_11\\_01\\_archive.html](http://dna-barcoding.blogspot.com.au/2012_11_01_archive.html)

# Uses for NGS

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<http://ucanr.edu/blogs/blogcore/p>



[http://www.daff.qld.gov.au/26\\_14635.htm](http://www.daff.qld.gov.au/26_14635.htm)



[http://dna-barcoding.blogspot.com.au/2012\\_11\\_01\\_archive.html](http://dna-barcoding.blogspot.com.au/2012_11_01_archive.html)

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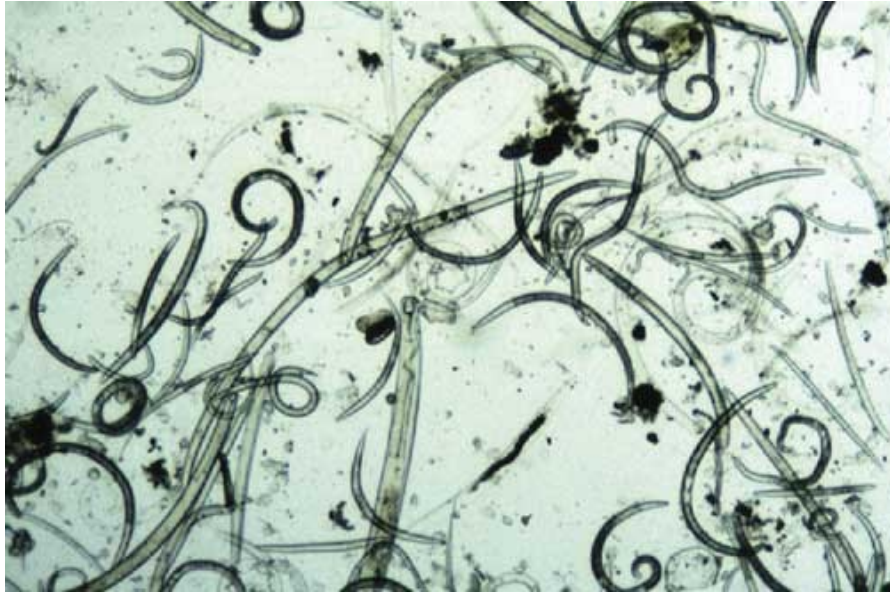
[http://www.dpi.gov.au/26\\_14635.htm](http://www.dpi.gov.au/26_14635.htm)



<http://www.topnews.in/call-global-fight-against-wheat-killer-287841>

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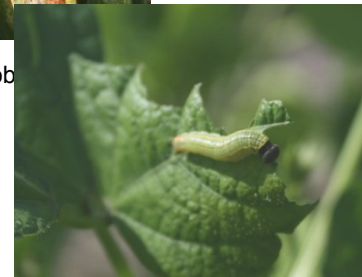
<http://ucanr.edu/blogs/blogcore/>



[http://www.gov.au/26\\_14635.htm](http://www.gov.au/26_14635.htm)



<http://www.topnews.in/call-glob>



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<http://bloominthyne.com/tag/companion-planting/>

# Advantages and Disadvantages of NGS

## Advantages

- Ability to:
- identify an organism, irrespective of life stage
- analyse a **greater number** and **range** of organisms all at once

## Disadvantages

- \$\$ per run
- Errors
- DNA segment choice

# Course Evaluation

- I would have liked:
  - More examples of current and potential uses in biosecurity
- I think others would have liked:
  - a full demonstration of the methodology in the lab\*

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# Thank you



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**CRC** PLANT biosecurity

*biosecurity* built on science