



# *The Case for Authorship*

A One-Act, Open-Ended Play

By

Frank Macrina

## **The Play**

Dr. Lynn Newell, a chemistry professor at a major university is the principal investigator of a large federal grant to study the properties of naturally occurring substances isolated from lower plants that live in unusual environments (e.g., mushrooms , fungi ). A novel lichen (fungus) isolated by Chris Evans two years ago in Yellowstone National Park has been under intense study in Newell's lab ever since. A heat resistant form of the enzyme DNA ligase has been purified from it. This enzyme, which seals gaps in DNA strands, has been thoroughly characterized. The gene for it has been cloned and over-expressed in recombinant *Escherichia coli* allowing purification of large amounts of the enzyme. The nucleotide sequence of the DNA ligase gene has been determined and analyzed. This enzyme has sparked enormous intellectual and commercial interest. A heat resistant DNA ligase has never been reported in a fungus before, so this discovery creates interesting questions about molecular evolution, gene transfer, and DNA synthesis and repair. What is more, Newell and collaborators have designed a revolutionary genetic test using their heat resistant DNA ligase. They have demonstrated its utility in linking select stretches of DNA which may be diagnostic for certain genetic diseases. At the regular Friday noon meeting of all lab personnel and collaborators, Dr. Newell says it's time to prepare a manuscript describing these exciting results and submit it to the *Proceedings of the National Academy of Sciences*. Dr. Newell starts a discussion to decide whose names will appear on the author by-line of the paper (or alternatively in the acknowledgements). Newell asks everyone to describe their involvement in the work in order to begin a discussion about what contributions merit authorship on the paper.

### **The Players: Members of the Newell laboratory and collaborators**

Dr. Lynn Newell: university professor of chemistry, principal investigator (lab chief).  
Played by: MARK DELBOY

Dr. Kim Lee: a research assistant professor working under Dr. Newell.  
Played by: TOM MURPHY

Pat Langella: a 4<sup>th</sup> year predoctoral trainee; Dr. Newell is Langella's Ph. D. supervisor.  
Played by: CHRIS HEFFELFINGER

Brook Lovell: a Master's degree trainee working under Dr. Newell.  
Played by: GREG ZIEGLER

Dr. Fran McClure: an assistant professor in the department of chemistry whose area of research is enzymology.  
Played by: PETER LIKARISH

Phil Newton: a research associate in the department of genetics who directs the university's nucleic acid shared resource; this facility provides high throughput DNA sequencing and synthesis on a fee-for-service basis.  
Played by: DAVID BLACK

Robin Willow: one of Dr. Newell's technicians.  
Played by: JOSH GRANT

Casey Tucker: a Ph.D. biochemist, presently enrolled in law school; doing part-time postdoctoral research in Newell's lab.  
Played by: EMILY COLBY

Chris Evans: an undergraduate student who is doing an multi-year honors project under Dr. Newell's guidance.  
Played by: REBECCA GANETZKY

Dr. Sydney Chance: a postdoctoral fellow in Dr. Fran McClure's lab.  
Played by: LUKE CHANEY

Dr. C. J. Dalton: a new postdoctoral in Dr. Newell's lab. Just completed a degree in biochemistry.  
Played by: DANIELLE KING

Dr. Sam Patterson: professor of genetics at the university.  
Played by: ROBERT MULLOWNEY

The following two players have no scripted lines but are free to comment at any point during the play. They were invited to the meeting as facilitators by Dr. Newell. All are journal editors whose publications have guidelines that may be found at the URLs given below.

Dr. Lyndsey Schutte: editorial board member for *Journal of Biological Chemistry*  
<http://www.jbc.org/misc/itoa.shtml>  
Played by: Lyndsey Schutte

Dr. Gaurav Rana : editorial board member for *Proceedings of the National Academy of Sciences*  
<http://www.pnas.org/misc/iforc.shtml>  
Played by Gaurav Rana

NOTE TO CAST MEMBERS;

You may wish to visit the above URLs to get some guidance on authorship policies. Our three editors should definitely visit the pages of their own journals and familiarize themselves with anything that helps define authorship.

Some general sources information on authorship and publication practices may be found at:

<http://www.icmje.org/>  
(Uniform Requirements for Manuscripts Submitted to Biomedical Journals)

<http://www.sfn.org/guidelines>  
Society for Neuroscience: *Responsible Conduct Regarding Scientific Communication*

**Dr. Lynn Newell:** “Good morning, everyone. As you may remember when this project began, we had some casual conversations about who would be authors on a paper, should the results be publishable. We now have the exciting results and they certainly are publishable! So today, we need to get serious about who goes in the author’s byline or in the acknowledgements. I asked you each to prepare a concise statement about your part in the work in order to get this ball rolling. Today we’ll just arrive at who will be authors. We’ll work out the order of the author’s names on the byline at a later time. Let me begin with my comments.

I wrote the NIH grant proposal that provided funding for this work. It paid for research materials, and the salaries of Syd Chance and Kim Lee. The idea to look for a heat resistant DNA ligase was Fran McClure’s and the idea to commercially apply this discovery was Dr. Patterson’s. These experimental approaches were described in my NIH proposal, but the work of the entire DNA ligase project was only a minor part of overall thrust of the work. And, I did not hypothesize a heat resistant ligase in the proposal. McClure and Lee provided a lot of the scientific guidance to others in the lab who did experiments on this project. I did no experimental work on this project but I insist on reading, editing, and approving the planned manuscript. Finally, as you’re aware I’m Pat Langella’s mentor.

Regarding authorship, I believe I should...(STATE YOUR ARGUMENT FOR BEING AN AUTHOR, OR JUST BEING NAMED IN THE ACKNOWLEDGEMENTS [OR NEITHER])

Anyone have questions or comments?”

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**Dr. Lynn Newell:** “Kim, tell us specifically about your contribution.”

**Dr. Kim Lee:** “After a long struggle, I cloned the DNA ligase gene as a “side project” during a break in my own research activities. I did a preliminary characterization of the cloned gene and made milligram amounts of the recombinant plasmid carrying the gene. I gave this plasmid material to Pat Langella, who performed the nucleotide sequence analysis of the DNA ligase gene. I did a small amount of the experimental work on this proposed assay at Sam Patterson’s urging.

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**Dr. Lynn Newell:** “Thanks Kim. Well colleagues, comments or questions for Kim?”

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**Dr. Lynn Newell:** “Pat, tell us about your contribution”

**Pat Langella:** “I am a 4<sup>th</sup> year predoctoral trainee. Although Dr. Newell is my formal academic advisor, much of my laboratory mentoring is provided by Fran McClure. McClure is always available to provide guidance and critique my work. I purified and characterized the

enzyme with my own hands, and completed the nucleotide sequence of the gene. I plan to write the entire first draft of the manuscript, including composing all the data tables and manuscript drawings. I will do the literature search needed to critically review the field. Eventually, this manuscript will become a chapter in my Ph.D. dissertation.

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**Dr. Lynn Newell:** “Thanks Pat. Comments or questions for Pat?”

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**Dr. Lynn Newell:** “Your turn, Brook”

**Brook Lovell:** “I am working towards a Master’s degree in Dr. Newell’s lab. I have a B.S. degree and extensive experience in bioinformatics. I taught Pat Langella how to use several computer programs to analyze DNA and protein sequence information. Pat used this training to do all the computer analyses on the gene and to do a preliminary analysis on the protein product. On several occasions I helped Pat interpret his sequence information. My five weeks of instruction provided to Pat were equivalent to a 2 credit hour course. I also helped Pat learn a complex computer graphics programs for illustrating sequence data.

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**Dr. Lynn Newell:** “What do you think folks?”

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**Dr. Lynn Newell:** “Let’s hear from Fran McClure now”

**Dr. Fran McClure:** “I had the original idea to look for a heat resistant DNA ligase. I suggested several sources for isolating enzymes from lower plants living in extreme conditions. I designed the enzyme purification scheme, and supervised Pat Langella in this aspect of the work. I critiqued all data involving the enzyme isolation and purification. On several occasions, I suggested new experimental approaches to the enzyme purification, all of which proved fruitful.

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**Dr. Lynn Newell:** “What do you think about Fran’s contributions, everybody?”

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**Dr. Lynn Newell:** “Phil, tell us about your participation in this project”

**Phil Newton:** “I am in charge of the nucleic acid support facility which is co-sponsored by the chemistry and biochemistry departments. I used an automated DNA synthesizer to create 42 different oligonucleotides used by Pat Langella in determining the nucleotide sequence of the

DNA ligase gene. I worked closely with Pat in giving guidance on the design of the primers and their use. Several times, I helped Pat troubleshoot problems when the DNA sequencing did not work.

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**Dr. Lynn Newell:** “Thanks Phil. Any questions for Phil?”

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**Dr. Lynn Newell:** “Now let’s hear from Robin”

**Robin Willow:** “I am a program support technician employed by Dr. Newell. I plan to do copy editing on the manuscript that Pat Langella will write. I will also use a computer drawing program to prepare the figures needed for the manuscript. I will produce all the photographic quality computer-generated prints of figures needed to accompany the submitted manuscript.”

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**Dr. Lynn Newell:** “Thanks. Any questions or comments for Robin?”

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**Dr. Lynn Newell:** “Go ahead, Casey.”

**Casey Tucker:** “I am doing part-time postdoctoral work in Dr. Newell’s lab while I complete my final year of law school. I have expertise in intellectual property law. I provided advice and guidance in both the cloning and sequencing of this gene. Also, I performed about 100 hours of background research on the technology transfer implications of this discovery. I am advising Dr. Newell on the preparation of this manuscript in terms of intellectual property protection. I will edit the final manuscript and I will write and submit of a provisional patent application .

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**Dr. Lynn Newell:** “Any questions or comments for our future attorney!”

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**Dr. Lynn Newell:** “Talk to us, Chris!”

**Chris Evans:** “I am doing an undergraduate honors project under Dr. Newell’s supervision. I and my family spent our vacation in Yellowstone two years ago and Dr. Newell asked me to bring back some water samples and fungal specimens from the hot springs for my honors project. One of the lichen specimens I cultivated from these samples yielded the heat resistant DNA ligase. I did all the necessary taxonomic work to identify this lichen and stocked it in Dr. Newell’s culture collection.

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**Dr. Lynn Newell:** Comments, anyone?

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**Dr. Lynn Newell:** “Dr. Chance, the floor is yours.”

**Dr. Sydney Chance:** “ I was asked by Dr. Newell to help Pat with the protein bioinformatics. I showed Pat how to do comparative studies with the amino acid sequence of the DNA ligase protein. Pat had no training or experience in this kind of computer analysis, but was a quick study! The amino acid sequence comparisons turned out to be very interesting. I did some sophisticated phylogenetic tree analysis using a computer program I wrote, and together Pat and I concluded this DNA ligase is closely related to similar enzymes from bacteria that live in the hot springs at Yellowstone.

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**Dr. Lynn Newell:** “We’re open for discussion about Dr. Chance’s contributions”

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**Dr. Lynn Newell:** “C.J., you’re next.”

**Dr. C. J. Dalton:** “As you all may remember, cloning the DNA ligase gene was very difficult. While at lunch with Kim Lee, I learned about this project and suggested that Kim try a new *E. coli* host strain developed for difficult cloning work. I help design and “build” this strain during my predoctoral training. I am listed as a co-inventor of it on the U.S. patent that was issued last month. The strain was licensed to a biotech company which is now selling it. However, the strain had not been described in print, and had not been distributed outside of the lab when Kim was trying to clone the lichen gene. I got my predoctoral mentor’s permission to use the strain, which I then provided to Kim. I knew the strain would work because it had been designed to circumvent problems associated with highly methylated DNA which was rich in guanine and cytosine. This was the origin of Kim’s cloning problems. In short, I am convinced the lichen DNA would have not been cloned without using our special strain.

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**Dr. Lynn Newell:** “Questions for C. J. from the group?”

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**Dr. Lynn Newell:** “And last but not least! Please proceed professor.”

**Dr. Sam Patterson:** “The idea to use the lichen derived enzyme in a genetic test was mine. When Lynn told me about the enzyme, the idea of a test that has the features of polymerase chain reaction, but instead links DNA fragments during cycles of high and low temperature hit me immediately. I designed the whole test on paper, identified some test genes from the human genome database, and emailed the information to Lynn. Someone in Lynn’s group – I’m not sure who – actually performed the test using the prototype model I suggested and it worked.

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**Dr. Lynn Newell:** “Thoughts from the group?”

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