



**BERKELEY LAB**

Joint BioEnergy Institute (Feedstocks Division)

# Chien-Yuan (Kevin) Lin

*Plant Molecular Genetics & Biotechnology*

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**Citizenship** Taiwan (**Permanent resident** of United States of America)

## ***Education***

- Ph.D.** North Carolina State University (NCSU), Raleigh, NC, USA. **1/2011 – 5/2015**  
Forestry and Environmental Resources (Minor in Biotechnology)
- M.Sc.** National Taiwan University (NTU), Taipei, Taiwan. **9/2007 – 6/2009**  
Microbiology and Biochemistry
- B.S.** National Taiwan University (NTU), Taipei, Taiwan. **9/2003 – 6/2007**  
Life Science
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## ***Research/Teaching Experience***

- 6/2020 – Present** **Biological Engineering Project Scientist**  
*Lawrence Berkeley National Laboratory (LBNL)*, Berkeley, CA, USA.  
*Joint Bioenergy Institute (JBEI)*, Emeryville, CA, USA.
- 4/2020 – 6/2020** **Biologist Postdoctoral Fellow**  
*LBNL*, Berkeley, CA, USA.  
*JBEI*, Emeryville, CA, USA.
- 4/2018 – 4/2020** **Biologist Postdoctoral Scholar**  
*LBNL*, Berkeley, CA, USA.  
*JBEI*, Emeryville, CA, USA.
- 6/2015 – 3/2018** **Plant Cell Wall / Molecular Postdoctoral Researcher**  
*National Renewable Energy Laboratory (NREL)*, Golden, CO, USA.
- 1/2011 – 5/2015** **Doctoral Research Assistant**  
*North Carolina State University (NCSU)*, Raleigh, NC, USA.
- 2008 – 2009** **Master's Teaching Assistant**  
*National Taiwan University (NTU)*, Taipei, Taiwan.
- 6/2006 – 7/2006** **Summer Research Intern @ Forest Biotechnology Group**  
*NCSU*, Raleigh, NC, USA.
- 2004 – 2006** **College Research Assistant**  
*NTU*, Taipei, Taiwan.
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## *Affiliation*

- 2011 – Present American Society of Plant Biologists (ASPB)  
2018 – Present Department of Plant and Microbial Biology (UC Berkeley)
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## *Mentor Experience/Award*

- 2020 **Exceptional Mentor Award**  
*Biotech Partners*, Berkeley, USA.
- 2020 **Instructor, California Institute for Quantitative Biosciences (QB3)**  
*University of California at Berkeley*, Berkeley, USA.
- 6/2019 – 8/2019 **Jillian Curran** (Current college student @ [California Polytechnic State University](#))
- 8/2018 – 3/2020 **Jasmine Ortega** (Current Data Analyst)
- 7/2017 – 9/2017 **Manal Yunes** (Current Data Analyst @ [Capitalize Analytics](#))  
\* Elected to present at Advanced Technological Education (ATE) Conference, Washington, DC.
- 10/2015 – 5/2016 **Neha Ajuja** (Current Postdoctoral Researcher @ [UT Southwestern Medical Center](#))
- 6/2011 **Ying-Chen Lin** (Current graduate student @ [Michigan State University](#))
- 6/2007 – 8/2007 **Yi-Ting Wang** (Graduated from National Chiao Tung University, Taiwan)
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## *Seminars/Outreach*

- 1/2021 **Invited Panelist** — Virtual seminar (working in the National Labs)  
*NREL*, Golden, CO, USA.
- 7/2020 **Panelist** — Summer Virtual Internship Program (sVIP)  
*Biotech Partners*, Berkeley, CA, USA.
- 2/2020 **Speaker** — Networking lunch with biotech students and career advisory  
*Biotech Partners*, Berkeley, CA, USA.
- 2019 **Mentor** — Educating underserved youth and improve access to science careers  
*Biotech Partners*, Berkeley, CA, USA.
- 11/2018 **Volunteer** — JBEI booth @ Bay Area Science Festival (BASF) for Discovery Day  
*AT&T Park*, San Francisco, CA, USA.
- 2017 **Invited Introducer** — From Fuel Cell Vehicles to Chemicals Infrastructure  
*RMSSE Annual Conference*, Englewood, CO, USA.
- 2016 **Invited volunteer** — ASPB booth @ National association of biology teachers (NABT)  
*NABT Professional Development Conference*, Denver, CO, USA.
- 2016 **Invited Introducer** — New Concept in Energy Renewal and Solar Applications  
*RMSSE Annual Conference*, Englewood, CO, USA.
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## ***Presentations***

- 9/2021 Production of a biodegradable polyester precursor, 2-pyrone-4,6-dicarboxylic acid (PDC), by plant synthetic biology concurrently stacks reduced biomass recalcitrance traits for biofuel production  
*ASPB Plant Synthetic Biology. (Oral)*
- 6/2021 Lignin manipulation via plant synthetic biology  
*JBEI Annual meeting, JBEI, Emeryville, CA, USA. (Oral)*
- 7/2020 Plant-based Renewable Bioproducts  
*Berkeley Lab Research Slam (LBNL), Berkeley, CA, USA. (Oral)*
- 1/2020 Towards Sustainable Bioeconomy through Lignin Manipulation in Feedstocks  
*Biosciences Area Operations (UC Berkeley), Berkeley, CA, USA. (Oral)*
- 2019 Lignin manipulation  
*JBEI Annual meeting, JBEI, Emeryville, CA, USA. (Oral)*
- 2018 Lignin manipulation in feedstocks toward lignin valorization and bioproducts  
*JBEI Annual DOE Review, JBEI, Emeryville, CA, USA. (Oral)*
- 2018 Develop molecular design principles to facilitate biomass and cell wall disassembly  
*C3Bio Annual Meeting 2018, Purdue University, West Lafayette, IN, USA. (Oral)*
- 2017 Tailoring biomass to boost biofuel production using herbaceous and woody plants  
*C3Bio Center Meeting 2017, NREL, Golden, CO, USA. (Poster)*
- 2016 Improving transgenic switchgrass protocol for a rapid and simplified process  
*C3Bio Center Meeting 2016, NREL, Golden, CO, USA. (Poster)*
- 2015 Plans for the tailoring biomass in the herbaceous plant  
*C3Bio Center Meeting 2015, NREL, Golden, CO, USA. (Poster)*
- 2013 Dynamic Metabolic-Flux (PDMF) Model: Data acquisition  
*Forest Biotechnology Industrial Research Consortium, NCSU, Raleigh, NC, USA. (Oral)*
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## ***Honors and Awards***

- 2021 **Selected Speaker @ Plant Synthetic Biology 2021 Conference**  
*Virtual Conference.*
- 2021 **Co-editor for book series of “Methods in Molecular Biology”**
- 2020 **Poster Award @ EGSB Annual meeting**  
*Biosciences Area Operations (UC Berkeley), Berkeley, CA, USA.*
- 2019 **Travel Award @ Plant Synthetic Biology 2019 Conference**  
*American Society of Plant Biologists (ASPB), San Jose, CA, USA.*
- 2019 **Invited Speaker @ JBEI Annual Meeting**  
*JBEI, Emeryville, CA, USA.*
- 2018 **Community Building Award @ Feedstocks Annual Meeting**  
*JBEI, Emeryville, CA, USA.*
- 2018 **Invited Speaker @ C3Bio Annual Meeting**  
*Purdue University, West Lafayette, IN, USA.*
- 2017 **Employees of the Month**  
*National Renewable Energy Laboratory (NREL), Golden, CO, USA.*
- 2013 **Invited Speaker @ Forest Biotechnology Industrial Research Consortium (FORBIRC)**  
*NCSU, Raleigh, NC, USA.*
- 2010–14 **Graduate Student Support Plan (GSSP)**  
*NCSU, Raleigh, NC, USA.*
- 2006 **Summer research internship**  
*NCSU, Raleigh, NC, USA.*
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## Research Grants

- **Understanding lignin manipulation towards high-yield bioproduct production**  
*Laboratory Directed Research and Development (LDRD)*, Lawrence Berkeley National Laboratory (LBNL)  
USD 225,000 (Proposed, 2021).
- **Production of a biodegradable plastic precursor in *Miscanthus***  
*Laboratory Directed Research and Development (LDRD)*, Lawrence Berkeley National Laboratory (LBNL)  
USD 225,000 (Proposed, 2021).
- **Production of a biodegradable plastic precursor in sorghum**  
*Laboratory Directed Research and Development (LDRD)*, Lawrence Berkeley National Laboratory (LBNL)  
USD 240,000 (Proposed, 2020).
- **Revisit the methylation during wood formation in *Populus trichocarpa***  
*Laboratory Directed Research and Development (LDRD)*, Lawrence Berkeley National Laboratory (LBNL)  
USD 225,000 (Proposed, 2020).
- **Field testing of engineered bioenergy trees**  
*Laboratory Directed Research and Development (LDRD)*, Lawrence Berkeley National Laboratory (LBNL)  
USD 200,000 (Proposed, 2019).
- **Expression of *Escherichia coli* heat-labile enterotoxin subunits in *Saccharomyces cerevisiae*, and their application as adjuvant**  
*National Science Council research project, NTU*, USD 1,000 (Awarded, 2005 – 2006).

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## Conference Proceedings

- 2021 Production of a biodegradable polyester precursor, 2-pyrone-4,6-dicarboxylic acid, by plant synthetic biology concurrently stacks reduced biomass recalcitrance traits for biofuel production  
*ASPB Plant Synthetic Biology* (Virtual).
- 2021 Lignin manipulation via plant synthetic biology to produce a biodegradable polyester precursor with concurrent improvement in biomass quality for biofuel production  
*Genomic Sciences Program (GSP) Annual PI Meeting 2021* (Virtual).
- 2020 Towards sustainable bioeconomy through lignin manipulation in feedstocks  
*Biosciences Area Operations (UC Berkeley)*, Berkeley, USA.
- 2019 Lignin manipulation through metabolic engineering of shikimic acid pathway  
*ASPB Plant Synthetic Biology*, San Jose, CA, USA.
- 2019 Lignin manipulation through metabolic engineering of shikimic acid pathway  
*"Plant Metabolic Engineering" Gordon Research Seminar/Conference* (GRS/GRC), Barga, Italy.
- 2018 Lignin manipulation in sorghum to reduce biomass recalcitrance and accumulate bioproducts  
*"Lignin" Gordon Research Conference* (GRC), Easton, MA, USA.
- 2017 Tailoring biomass to boost biofuel production using herbaceous and woody plants  
*NREL BEST poster*, NREL, CO, USA.
- 2017 Tailoring biomass to boost biofuel production using herbaceous and woody plants  
*American Society of Plant Biologists Conference*, Honolulu, HI, USA.
- 2015 Building a plant protoplast platform to study the effect of biocatalyst deposition during plant cell wall regeneration  
*C3Bio annual meeting*, Purdue University, IN, USA.
- 2014 Complete proteomic-based enzyme reaction and inhibition kinetics reveal how monoglignol biosynthetic enzyme families affect metabolic flux and lignin in *Populus trichocarpa*  
*American Society of Plant Biologists Conference*, Providence, RI, USA.

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## *News Releases*

- Invited topic: Global plastic pollution (**UC Berkeley QB3 News**, Jul 27, 2021).
- JBEI Invention: PDC production *in planta* (**Phys.org**, Jul 1, 2021).
- JBEI Mentorship: Biotech Partners 2019, Emeryville (**Biosciences News**, Aug 14, 2019).
- ASPB Education and Outreach: NABT 2016, Denver (**ASPB News**, Vol. 14, No.1, 2017).
- Lignin breakthroughs serve as GPS for plant research (**NC State News**, March 11, 2014)

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## *Technical Reports*

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| 2016        | <b>NREL Laboratory Directed Research and Development Program (LDRD)</b> – 4th quarter reports – Method development for detecting extracellular proteins in apoplastic fluid versus ionically bound cell wall proteins. |
| 2015 – 2016 | <b>C3Bio “Annual” Project Review</b> – Streamline the delivery of catalysts designed to interact with biomass. Award Number DE-SC0000997.  |

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## *Certificates*

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| 2019 | <b>Scientific Leadership &amp; Management</b> , <i>Gladstone Institutes</i> , San Francisco, CA |
| 2018 | <b>Python for Data Science</b> , <i>NREL</i> , Golden, CO                                       |
| 2017 | <b>Python for Scientists and Engineers</b> , <i>NREL</i> , Golden, CO                           |

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## *Academic Service as reviewer*

- **Annals of Agricultural Science** (2020[1])
- **Biotechnology for Biofuels** (2017 [2]; 2018 [1]; 2019 [1], 2020 [1] , 2021 [1])
- **Gene** (2021 [1])
- **International Journal of Molecular Sciences** (2021 [1])
- **Planta** (2014 [1], 2019 [1])
- **Plant Methods** (2018 [1])
- **Scientific Reports** (2016 [1])

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## **Peer-Reviewed Publications** (chronological order)

1. **Lin CY\***, Tian Y\*, Nelson-Vasilchik K, Hague J, Kakumanu R, Lee MY, Trinh J, Northen TR, Baidoo EEK, Kausch AP, Scheller HV, Eudes A. Engineering sorghum for higher 4-hydroxybenzoic acid content. **BioRxiv** 2021.07.13.452095 (*Under review*) (\*equal contribution first author)
2. **Lin CY\***, Sun Y\*, Song J\*, Chen HC, Shi R, Yang CM, Liu J, Tunlaya-Anukit S, Liu BG, Loziuk PL, Williams CM, Muddiman DC, Lin YC, Sederoff RR, Wang JP, Chiang VL. Ptr4CL-PtrHCT enzyme complexes modulate co-enzyme A ligation of hydroxycinnamic acids for monolignol biosynthesis in *Populus trichocarpa* (2021). **Frontiers in Plant Science**, 12: 2223 (\*equal contribution first author)
3. **Plant Cell Atlas Consortium**, Ghosh Jha SG, Borowsky AT, Cole BJ, Fahlgren N, Farmer A, Huang SSC, Karia P, Libault M, Provart NJ, Rice SL, Saura-Sanchez M, Agarwal P, Ahkami AH, Anderton CR, Brigg SP, Brophy JA, Denolf P, Costanzo LFD, Exposito-Alonso M, Giacomello S, Gomez-Cano F, Kaufmann K, Ko DK, Kumar S, Malkovskiy AV, Nakayama N, Obata T, Otegui MS, Palfalvi G, Quezada-Rodriguez EH, Singh R, Uhrig RG, Waese J, Wijk KV, Wright CR, Ehrhardt DW, Birnbaum KD and Rhee SY. Vision, challenges and opportunities for a Plant Cell Atlas (2021). **ELife**, 10: e66877.
4. **Lin CY**, Vuu K, Amer B, Shih PM, Baidoo EEK, Scheller HV and Eudes A. Production of the polyester precursor 2-pyrone-4,6-dicarboxylic acid in plants: Stacking reduced biomass recalcitrance with value-added coproduct (2021). **Metabolic engineering** 66: 148-156.
5. **Lin CY**, Donohoe BS, Yang HB, Yunes M, Sarai NS, Shollenberger T, Bomble YJ, Decker SR, Chen XW, Tucker MP, Wei H and Himmel ME. Iron incorporation improves the yield and saccharification of switchgrass (*Panicum virgatum* L.) biomass. (2021). **Biotechnology for Biofuel**, 14: 55.
6. Wang W, Knoshaug EP, Wei H, Van Wychen S, **Lin CY**, Vander Wall T, Xu Q, Himmel ME and Zhang M. High titer fatty alcohol production in *Lipomyces starkeyi* by fed-batch fermentation (2020). **Current Research in Biotechnology**, 2: 83-87.
7. **Lin CY** and Eudes A. Strategies for the production of biochemicals in bioenergy crops. (2020). **Biotechnology for Biofuels**, 13: 71.
8. Wei H, Wang W, Alper HS, Xu Q, Knoshaug EP, Wychen SV, **Lin CY**, Luo YH, Decker SR, Himmel ME, Zhang M. (2019). Ameliorating the metabolic burden of the co-expression of secreted fungal cellulases in a high lipid-accumulating *Yarrowia lipolytica* strain by medium C/N ratio and a chemical chaperone. **Frontiers in Microbiology**, 9: 3276.
9. Wang JP, Matthews M, Shi R, Yang C, Tunlaya-Anukit S, Chen HC, Li Q, Liu J, **Lin CY**, Naik P, Sun YH, Loziuk PL, Yeh TF, Kim H, Gjersing E, Shollenberger T, Shuford CM, Song J, Miller Z, Huang YY, Edmonds CW, Lin YC, Wei Li, Chen H, Peszlen I, Williams CM, Ducoste JJ, Ralph J, Chang H, Muddiman DC, Davis M, Smith C, Isik F, Sederoff RR, Chiang VL (2018). Integrative analysis of lignin biosynthesis to improve wood properties. **Nature Communications**, 9: 1579.
10. **Lin CY**, Donohoe BS, Ahuja N, Garrity DM, Qu R, Tucker MP, Himmel ME, and Wei H (2017). Evaluation of parameters affecting switchgrass tissue culture: toward a consolidated procedure for *Agrobacterium*-mediated transformation of switchgrass (*Panicum virgatum*). **Plant Methods**, 13:113.
11. Bomble YJ, **Lin CY**, Amore A, Wei H, Holwerda EK, Ciesielski PN, Donohoe BS, Decker SR, Lynd LR, and Himmel ME (2017). Lignocellulose deconstruction in the biosphere. **Current Opinion in Chemical Biology**, 41:61-70.

12. **Lin CY**, Jakes JE, Donohoe BS, Ciesielski PN, Yang H, Gleber SC, Vogt S, Ding SY, Peer WA, Murphy AS, McCann MC, Himmel ME, Tucker MP, Wei H (2016). Directed plant cell-wall accumulation of iron: embedding co-catalyst for efficient biomass conversion. *Biotechnology for Biofuels*, 9: 225.
13. Amore A, Ciesielski PN, **Lin CY**, Salvachúa D, Nogué VS (2016). Development of lignocellulosic biorefinery technologies: recent advances and current challenges. *Australian Journal of Chemistry*, 69: 1201-1218.
14. **Lin CY**, Li Q, Tunlaya-Anukit S, Shi R, Sun YH, Wang JP, Liu J, Loziuk P, Edmunds CW, Miller ZD, Peszlen I, Muddiman DC, Sederoff RR and Chiang VL (2016). A cell wall-bound anionic peroxidase, PtrPO21, is involved in lignin polymerization in *Populus trichocarpa*. *Tree Genetics and Genomes*, 12: 1-18.
15. Zhao S, Wei H, **Lin CY**, Zeng YI, Tucker MP, Himmel ME, and Ding SY (2016). *Burkholderia phytofirmans* inoculation-induced changes on the shoot cell anatomy and iron accumulation reveal novel components of *Arabidopsis*-endophyte interaction that can benefit downstream biomass deconstruction. *Frontiers in Plant Science*, 7: 24.
16. **Lin CY\***, Wang JP\*, Chen HC, Liu J, Sederoff RR, Chiang VL (2015). 4-Coumaroyl and caffeoyl shikimic acids inhibit 4-coumaric acid: coenzyme A ligases and modulate metabolic flux for 3-hydroxylation in monolignol biosynthesis of *Populus trichocarpa*. *Molecular Plant*, 8: 176-187. (\*equal contribution first author)
17. Loziuk PL, Parker J, Li W, **Lin CY**, Wang JP, Quanzi Li, Sederoff RR, Chiang VL, and Muddiman DC (2015). Elucidation of xylem-specific transcription factors and absolute quantification of enzymes regulating cellulose biosynthesis in *Populus trichocarpa*. *Journal of Proteome Research*, 14: 4158-4168.
18. Lin YC, Li W, Chen H, Li Q, Sun YH, Shi R, **Lin CY**, Wang JP, Chen HC, Chuang L, Qu G, Sederoff RR, Chiang VL (2014). A simple improved-throughput xylem protoplast system for studying wood formation. *Nature protocols*, 9: 2194-2205.
19. Li W, Lin YC, Li Q, Shi R, **Lin CY**, Chen H, Chuang L, Guan ZQ, Sederoff RR, Chiang VL (2014). A robust chromatin immunoprecipitation protocol for studying transcription factor–DNA interactions and histone modifications in wood-forming tissue. *Nature protocols*, 9: 2180-2193.
20. Wang JP, Naik PP, Chen HC, Shi R, **Lin CY**, Liu J, Shuford CM, Li Q, Sun YH, Tunlaya-Anukit S, Williams CM, Muddiman DC, Ducoste JJ, Sederoff RR, Chiang VL (2014). Complete proteomic based enzyme reaction and inhibition kinetics reveal how monolignol biosynthetic enzyme families affect metabolic-flux and lignin. *The Plant Cell*, 26, 894-914.
21. Liu W, Chen, JR, Hsu, CH, Li, YH, Chen, YM, **Lin CY**, Huang, SJ, Chang ZK, Chen, YC, Lin, CH, Gong, HY, Lin, CC, Kawakami K and Wu JL (2012). A zebrafish model of intrahepatic cholangiocarcinoma (ICC) by dual expression of hepatitis B virus X and hepatitis C virus core protein in liver. *Hepatology*, 56, 2268-2276.

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### **Book Chapters** (chronological order)

1. **Lin CY**, Wei H, Tucker MP, Donohoe BS and Himmel ME. An improved leaf protoplast system for highly efficient transient expression in switchgrass (*Panicum virgatum* L.) (2020). *Metabolic Pathway Engineering: Methods and Protocols*. 61-79
  2. Decker SR, Sheehan J, Dayton DC, Bozell JJ, Adney WS, Aden A, Hames B, Thomas SR, Bain RL, Brunecky R, **Lin CY**, Amore A, Chen XW, Tucker MP, Czernik S, Sluiter A, Zhang M, Magrini K, and Himmel ME (2017). Biomass Conversion. *Handbook of Industrial Chemistry and Biotechnology*. 285-419|.
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