Caio L. dos Santos

clsantos@iastate.edu | cldossantos.github.io | linkedin.com/in/cldossantos/

Summary

I am currently a Ph.D. candidate in the Department of Agronomy at Iowa State University, with an interest in data science, statistics, and process-based model applications in agriculture. Alongside my Ph.D. in Crop Production and Physiology, I am also working toward a Minor in Statistics. My research focuses on using digital tools- such as yield monitors, remotely sensed data, and crop models- to quantify and manage the spatio-temporal variability of cropping systems for efficient crop production. There are several research areas that fascinate me. A short list of those would be: crop physiology, crop models, remote sensing, soil fertility, and statistical models.

Education

Ph.D., Crop Production and Physiology **December of 2025***

**expected graduation date*

- Department of Agronomy, Iowa State University, Ames, Iowa, US
- Minor in Statistics
- Major advisor: Fernando Miguez

M.S., Crop, Soil, and Environmental Sciences **2020**

- Department of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayetteville, Arkansas, US
- Major advisors: Larry Purcell and Trent Roberts
- *Thesis: Managing corn nitrogen fertility in Arkansas based on data from an unmanned aerial system*

B.S., Agronomy **2018**

- College of Agriculture "Luiz de Queiroz", University of Sao Paulo, Piracicaba, Sao Paulo, Brazil
- Major advisor: Jose Laercio Favarin
- *Thesis: Determination of the water potential threshold at which rice growth is impacted*

Research experience

Graduate research assistant **2020 - present**

- Department of Agronomy, Iowa State University, Ames, Iowa, US

Graduate research assistant **2018 - 2020**

- Derpartment of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayeteville, Arkansas, US

Undergraduate visiting scholar **2017**

- Derpartment of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayeteville, Arkansas, US

Undergraduate research fellow **2016 - 2017**

- Derparment of Crop Production, University of Sao Paulo, Piracicaba, Sao Paulo, Brazil

Fellowships, Honors, and Awards

Research Excellence Award **2025**
- Graduate College, Iowa State University

3rd Place in the PhD Poster Competition **2024**
- Precision Agriculture Systems Community, San Antonio, Texas, US

Preparing Future Faculty Fellow **2024**
- Graduate College, Iowa State University

Agronomy Teaching Fellowship **2023**
- Department of Agronomy, Iowa State University

Outstanding Master's Student **2020**
- Department of Crop, Soil, and Environmental Sciences, University of Arkansas

2nd Place in the master's division at Gamma Sigma Delta Student Competition **2019**
- Fayetteville, Arkansas, US

Undergraduate Research Fellowship **2017**
- The São Paulo Research Foundation (FAPESP)
  Research title: Determination of the water potential threshold at which rice growth is impacted

Publications

Peer-reviewed

1. **dos Santos**, C.L., & Miguez, F.E. (2024). PACU: Precision Agriculture Computational Utilities. SoftwareX, 28, 101971.

2. Pessotto, M. V., Roberts, T.L., Bertucci, M., **dos Santos**, C., Ross, J., and Savin, M. (2023). Determining cardinal temperatures for eight cover crop species. Agrosystems, Geosciences & Environment, 6, e20393.

3. **dos Santos**, C. L., Miguez, F. E., King, K. A., Ruiz, A., Sciarresi, C., Baum, M. E., Danalatos, G. J. N., Stellman, M., Wiley, E., Pico, L.O., Thies, A., Puntel, L. A., Topp, C. N., Trifunovic, S., Eudy, D., Mensah, C., Edwards, J. W., Schnable, P. S., Lamkey, K. R., ... , and Archontoulis, S. V. (2023). Accelerated leaf appearance and flowering in maize after four decades of commercial breeding. Crop Science, 1–13.

4. Ruiz, A., Trifunovic, S., Eudy, D.M., Sciarresi, S. C., Baum, M., Danalatos, G.J.N., Elli, E.F., Kalogeropoulos,G., King, K., **dos Santos**, C.L., Thies, A., Pico, L.O., Castellano, M.J., Schnable, P.K., Topp, C., Graham, M., Lamkey, K.R., Vyn, T.J., and Archontoulis, S.V. (2023). Harvest Index has increased over the last 50 years of maize breeding. Field Crops Research, 300, 10900.

5. **dos Santos**, C.L.; Abendroth, L.J.; Coulter, J.A.; Nafziger, E.D.; Suyker, A.; Yu, J.; Schnable, P.S.; Archontoulis, S.V. (2022). Maize leaf appearance rates: a synthesis from the United States corn belt. Frontiers in Plant Science, 13.

6. **dos Santos**, C.L., T.L. Roberts, and L.C. Purcell. (2021). Leaf nitrogen sufficiency level guidelines for midseason fertilization in corn. Agronomy Journal, 113, 1974-1980.

7. **dos Santos**, C.L., T.L. Roberts, L.C. Purcell. (2020). Canopy greenness as a midseason nitrogen management tool in corn production. Agronomy Journal. 112, 5279-5287.

8. **dos Santos**, C.L., M. Salmeron, and L.C. Purcell. (2019). Soybean phenology prediction tool for the Midsouth. Agricultural and Environmental Lettters, 4, 190036.

9. **dos Santos**, C.L., A.F. De Borja Reis, P. Mazzafera, J.L. Favarin. (2018). Determination of the water potential threshold at which rice growth is impacted. Plants 7, 48.

Extension publications

1. Purcell, L.C., C.L. **dos Santos** , and M. Salmerón. (2021). Soybean development stage predictions. Cooperative Extension Service, University of Arkansas.

2. Hoegenauer, K. A., Roberts, T. L., Kelley, J. P., Morgan, R. B., & **dos Santos**, C. L. (2020). Investigating corn response to magnesium on a deficient soil in Arkansas. Arkansas Soil Fertility Studies, 38.

3. **dos Santos**, C.L., T.L. Roberts and L.C. Purcell. (2020). Dark Green Color Index as a midseason nitrogen management tool in corn production systems. In N.A.Slaton (eds.). Wayne E. Sabbe Arkansas Soil Fertility Studies 2019, (In press). Arkansas Agricultural Experiment Station, University of Arkansas Division of Agriculture, Fayetteville.

4. **dos Santos**, C.L., T.L. Roberts and L.C. Purcell. (2020). Nitrogen sufficiency level guidelines for pretassel fertilization in Arkansas. In N.A.Slaton (eds.). Wayne E. Sabbe Arkansas Soil Fertility Studies 2019, (In press). Arkansas Agricultural Experiment Station, University of Arkansas Division of Agriculture, Fayetteville.

5. dos Santos, C.L., L.C. Purcell, and W.J. Ross. (2018). Developing a new staging system for soybean. In: J.D. Ross (eds.). Arkansas Soybean Research Series 2016. (In press). Arkansas Agricultural Experiment Station, University of Arkansas Division of Agriculture, Fayetteville.

Conference abstracts

1. Carvalho-Moore, P., Norsworthy, J., Porri, A., **dos Santos**, C.L., Barber, T., Sudhakar, S., Meiners, I., & Lerchl, J. (2025). Is glufosinate resitance in Palmer Amaranth spreading in Mississippi County, Arkansas? Southern Weed Science Society Annual Meeting, Charleston, SC.

2. **dos Santos**, C.L. & Miguez, F. (2025). Steering clear of noise in on-farm yield data. NC1210 Data Intensive Farm Management Conference, Cleawater, FL.

3. Andrade Pereira, P., Carvalho Costa, K., Elli, E. F., & **dos Santos**, C. (2024). Diverging responses in transpiration of soybean genotypes to vapor pressure deficit. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX.

4. Elli, E. F., Fernandes, S. B., Noia, R. D. S. Jr., & **dos Santos**, C.L. (2024) Soybean phenology adaptation to climate change: a straightforward solution? ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX.

5. **dos Santos**, C.L. & Miguez, F. (2024). PACU: Precision Agriculture Computational Utilities. ASA, CSSA, SSSA International Annual Meeting, San Antonio,TX.

6. Cesario Pereira Pinto, J. G., Balboa, G. R., Mueller, N. D., Slater, G. P., Frels, K., **dos Santos**, C.L., Miguez, F., & Puntel, L. A. (2024) Evaluation of apsim next generation for simulating winter wheat growth, phenology, and yield response to N. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX.

7. **dos Santos**, C.L. & Miguez, F. (2024). Steering clear of noise in on-farm yield data. ASA, CSSA, SSSA International Annual Meeting, San Antonio,TX.

8. **dos Santos**, C. L., Puntel, L., Bullock, D. & Miguez, F. (2024). Integrating nonlinear models and remotely sensed data to estimate crop cardinal dates. ICPA-ISPA, Manhattan, KS.

9. **dos Santos**, C., Puntel, L. A., Bullock, D., & Miguez, F. (2023) Integrating nonlinear models and remotely sensed data to estimate crop cardinal dates. ASA, CSSA, SSSA International Annual Meeting, St. Louis, MO.

10. Cesario Pereira Pinto, J. G., Mueller, N. D., Balboa, G. R., **dos Santos**, C., & Puntel, L. A. (2023) Assessing APSIM's performance in simulating winter wheat growth, phenology, and nitrogen uptake in Nebraska. ASA, CSSA, SSSA International Annual Meeting, St. Louis, MO.

11. Di Salvo, J., Elli, E. F., **dos Santos**, C., Damecharla, H., Gilsinger, J., Coulibaly, I., Pita, F., Cavanagh, C., Licht, M. A., Cooper, M., Hammer, G. L., & Archontoulis, S. V. (2021) "Modeling growth and development of soybean maturity groups 0 to 7 in Iowa" . ASA, CSSA, SSSA International Annual Meeting, Salt Lake City, UT.

12. **dos Santos**, C., Thies, A., Verhagen, G., King, K., Baum, M. E., Sciarresi, C., Di Salvo, J., Wright, E. E., Danalatos, G. J. N., Olmedo Pico, L. B., Mensah, C., Eudy, D., Miguez, F., Topp, C., Trifunovic, S., Lamkey, K. R., Vyn, T. J., & Archontoulis, S. V. (2021) Leaf appearance rates of maize hybrids released from 1980 to 2020. ASA, CSSA, SSSA International Annual Meeting, Salt Lake City, UT.

13. Sciarresi, C., Thies, A., **dos Santos**, C., Baum, M. E., Danalatos, G. J. N., Di Salvo, J., King, K., Ruiz, A., Trifunovic, S., Eudy, D., Topp, C., & Archontoulis, S. V. (2021) Root front velocity in maize hybrids released from 1980 to 2020. ASA, CSSA, SSSA International Annual Meeting, Salt Lake City, UT.

14. Kalogeropoulos, G., **dos Santos**, C., Baum, M. E., King, K., Wright, E. E., Ruiz, A., Lamkey, K. R., Trifunovic, S., Eudy, D., Vyn, T. J., & Archontoulis, S. V. (2021) Leaf area profiles of Bayer maize hybrids released from 1980 to 2020. ASA, CSSA, SSSA International Annual Meeting, Salt Lake City, UT.

15. Hoegenauer, K., Roberts, T. L., Kelley, J. P., Mulloy, R., & **dos Santos**, C. (2019) Investigating the effects of potassium and magnesium application rates on corn. ASA, CSSA and SSSA International Annual Meetings (2019), San Antonio, TX.

16. Mulloy, R., Roberts, T. L., Kelley, J. P., Hoegenauer, K., **dos Santos**, C., Hurst, B., Dillion, D., & Bolton, D. (2019). Do side-dress nitrogen rates influence pre-tassel nitrogen uptake in corn? ASA-CSSA-SSSA International Annual Meeting, November 11, San Antonio, Texas.

17. Hurst, B., Rorberts, T.L., Ross, W.J., Mulloy, R., Dillion, Dr., **dos Santos**, C.L., Hoegenauer, K., Bolton, D., Short-term influence of winter cover crops on yield in a corn-soybean rotation. ASA-CSSA-SSSA Internation Annual Meeting, November, 11, San Antonio, Texas.

18. **dos Santos**, C.L., M. Salmeron, L.C. Purcell. (2019). Soybean phenology prediction tool for the Midsouth, ASA-CSSA-SSSA International Annual Meeting, November 11. San Antonio, Texas.

19. **dos Santos**,C.L., T.L. Roberts, and L.C. Purcell. (2019). Managing corn nitrogen fertility based on data from an unmanned aerial system, ASA-CSSA-SSSA International Annual Meeting, November 11. San Antonio, Texas.

20. **dos Santos**, C.L., M. Salmeron, L.C. Purcell. (2019). Soybean phenology prediction tool for the Midsouth, Arkansas Crop Protection Association Meeting, November 19. Fayetteville, Arkansas.

21. **dos Santos**,C.L., T.L. Roberts, and L.C. Purcell. (2019). Managing corn nitrogen fertility based on data from an unmanned aerial system, Arkansas Crop Protection Association Meeting, November 20. Fayetteville, Arkansas.

22. **dos Santos**, C. L., J.L.C. Baptistella, and R.A. Migliavacca. Desenvolvimento das raízes do algodoeiro submetidas a doses crescentes de fertiliz antes minerais e organominerais. In: 14º Encontro nacional de plantio direto na palha, (2014), Bonito. Anais do 14º Encontro nacional de plantio direto na palha. Dourados: Embrapa Agropecuária Oeste, 2014. v. 1.

Software

pacu: Precision Agriculture Computational Utilities **2024**

- https://github.com/cldossantos/pacu
- R package for working with precision agriculture data, such as yield monitor, satellite, and weather.

Soystage – Online decision support tool for the Midsouthern U.S. **2019**

- http://soystage.uark.edu
- Webtool that predicts timing of lifecyle events for soybeans grown in the Midsouthern US.

Service and Offices held

Member of the Curriculum Committee of the Crop, Soil, and Environmental Sciences Major **2019**
- University of Arkansas, Fayeteville, Arkansas, US

President of the Crop, Soil, and Environmental Sciences Graduate Student Club 2019
- University of Arkansas, Fayeteville, Arkansas, US

Vice president of the Crop, Soil, and Environmental Sciences Graduate Student Club 2018
- University of Arkansas, Fayeteville, Arkansas, US

Teaching Experience

Teaching assistant in Crop and Soil Modeling (AGRON 525) **2022 - 2024**
- Iowa State University, Ames, Iowa, US
- This was a graduate and undergraduate level class with approximately 15 students
- Provided office hours to help with weekly assigments
- Developed and taught lectures on:
  - Soybean development response to temperature and photoperiod
  - Process-based crop model parameter optimization

Teaching assistant in Crop Development, Production, and Management (AGRON 280) **2023**
- Iowa State University, Ames, Iowa, US
- This was an undergraduate level class with approximately 70 students
- Taught a lecture on "Brazilian agriculture"
- Provided office hours to help with weekly assigments
- Graded weekly assignments

Guest Lecturer in Soybean Production (CSES 3322) **2023 and 2025**
- University of Arkansas, Fayeteville, Arkansas, US
- This was an undergraduate level class with approximately 30 students
- Taught a lecture on "Soybean development response to temperature and photoperiod"

Teaching assistant in Soil Fertility (CSES 5114) **2020**
- University of Arkansas,Fayeteville, Arkansas, US
- This was a graduate level class with approximately 30 students
- Provided office hours to help with weekly assigments
- Developed and taught lectures on:
  - History of soil fertility and crop growth
  - Plant essential nutrients
  - Nutrient mobility, solubility, and deficiency
  - Soil pH, salts, and lime requirement
  - Soil sampling methods
  - Plant and soil analysis
  - Soil test extraction methods
  - Fetilizer correlation and calibration

Professional Memberships

American Society of Agronomy (ASA)	**2018 - present**
Crop Science Society of America (CSSA)	**2018 - present**
Soil Science Society of America (SSSA)	**2018 - present**
International Society of Precision Agriculture	**2024 - present**

Languages

English - Fluent
Portuguese - Native

Programming languages

R, Python, C#, and JavaScript