Francisco Pinto Espinosa

Curriculum Vitae

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PERSONAL INFORMATION

Name:	Francisco Pinto Espinosa
Date and place of birth:	October 3rd, 1980, Orsay (France)
Nationality:	Chilean
Home Address:	Citlaltepetl 12 int. 7, CP: 06100 Cuauhtemoc, Mexico City, Mexico
Working Address:	International Maize and Wheat Improvement Center (CIMMYT) Global Wheat Program Carretera Mexico- Veracruz km 45, El Batan CP: 56237 Texcoco Mexico
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RESEARCH INTERESTS

- Use of remote sensing techniques for field phenotyping and understanding ecophysiological dynamics of crops at different spatio-temporal scales.
- Development of high-throughput phenotyping approaches for improving genetic gain in the context of wheat breeding.
- Development of high-throughput phenotyping approaches for quantify physiological traits in wheat for increasing the potential yield under different environments.
- Validation of sun- induced chlorophyll fluorescence as an indicator of photochemical activity and plants physiological status at canopy level.
- Exploit the potential use of passive measurements of sun-induced chlorophyll fluorescence to understand light and photosynthesis distribution within crop canopies.

EDUCATION AND DEGREES AWARDED

- Dr. agr. Universität Bonn and Forschungszentrum Jülich, 2015. Dissertation: “Remote sensing of photosynthetic efficiency using sun- induced chlorophyll fluorescence obtained from hyperspectral imaging”. Advisor: Prof. Dr. Uwe Rascher.
- MSc. in Agricultural Sciences, Fruit-tree physiology. University of Chile, 2008. Dissertation: “Effect of the solar radiation, including UV-B, on the expression of ELIPs proteins in young grapevine leaves”.
- B.Sc. in Agricultural Sciences. University of Chile, December 2004

CURRENT POSITION

January 2016- present	International Maize and Wheat Improvement Center (CIMMYT). Global wheat program. Associate Scientist, Remote Sensing, Global Wheat Program

PREVIOUS WORK EXPERIENCE

October 2009- December 2015	Institute of Plant Sciences, IBG-2 Research Center Jülich (Germany). PhD Research granted by DAAD- CONICYT scholarship/ Guest Researcher. • Field phenotyping using imaging systems within the framework of the CROP.SENSe.net project. • Operation and image analysis of the airborne sensor HyPlant within the framework of the HyFlex campaigns funded by the European Space Agency (ESA). • Development of a processing chain for retrieval of sun-induced chlorophyll fluorescence from the HyPlant sensor. HYPER project funded by ESA.
October 2008- March 2009	National Institute of Agricultural Research (INIA), Chile. Field researcher. Project funded by Valent Biosciences : "Effect of Abscisic Acid (ABA) on the color of Crimson Seedless and Red Globe grapes".
August- December 2007	Chile Andes Foods Inc. Strawberry production: Crop manager.
November 2005- July 2006	Faculty of Agricultural Science, University of Chile. Field researcher. Project funded by Chile Andes Foods Inc. "Induction of seedless berries in grapevine cv Muscat of Alexandria".
March- May 2004	Concha y Toro Wineries. Peumo, Cachapoal Valley, Chile. Assistant winemaker.

PUBLICATIONS

[1] **Pinto, F.,** M. Müller-Linow, A. Schickling, M.P. Cendrero-Mateo, A. Ballvora, and U. Rascher. 2017. Multiangular Observation of Canopy Sun-Induced Chlorophyll Fluorescence by Combining Imaging Spectroscopy and Stereoscopy. Remote Sens. 9(5): 415.

[2] **Pinto, F.,** Damm, A., Schickling, A., Panigada, C., Cogliati, S., Müller-Linow, M., Balvora A., Rascher, U. (2015*)* Sun- induced chlorophyll fluorescence from high resolution imaging spectroscopy data to quantify spatio-temporal patterns of photosynthetic function in crop canopies. *Plant, Cell & Environment (submitted)*.

[3] **Pinto F,** Mielewczik M, Liebisch F, Walter A, Greven H, Rascher U. (2013). Non-Invasive Measurement of Frog Skin Reflectivity in High Spatial Resolution Using a Dual Hyperspectral Approach. *Plos One* **8**(9): 11.

[4] Jansen M., **Pinto F.**, Nagel K.A., van Dusschoten D., Fiorani F., Rascher U., Schneider H.U., Walter A. & Schurr U. (2014) Non-invasive Phenotyping Methodologies Enable the Accurate Characterization of

Growth and Performance of Shoots and Roots. In: Genomics of Plant Genetic Resources (Eds R. Tuberosa, A. Graner, & E. Frison), pp. 173-206. Springer Netherlands.

[5] **Pinto, F.**, Berti, M., Olivares, D., Sierralta, W.D., Hinrichsen, P., Pinto, M. (2011). Leaf development, temperature and light stress control of the expression of early light-inducible proteins (ELIPs) in *Vitis vinifera* L. *Environmental and Experimental Botany* 72 (2), 2778-283.

[6] Muller-Linow M, **Pinto-Espinosa F**, Scharr H, Rascher U. 2015. The leaf angle distribution of natural plant populations: assessing the canopy with a novel software tool. *Plant Methods* 11(1): 11.

[7] M. Rossini, L. Nedbal, L. Guanter, A. Ač, L. Alonso, A. Burkart, S. Cogliati, R. Colombo, A. Damm, M. Drusch, J. Hanus, R. Janoutova, T. Julitta, P. Kokkalis, J. Moreno, J. Novotny, C. Panigada, **F. Pinto**, A. Schickling, D. Schüttemeyer, F. Zemek, and U. Rascher. 2015. Red and far red Sun-induced chlorophyll fluorescence as a measure of plant photosynthesis. *Geophys. Res. Lett., 42*

[8] Panigada C, Rossini M, Meroni M, Cilia C, Busetto L, Amaducci S, Boschetti M, Cogliati S, Picchi V, **Pinto F**, et al. 2014. Fluorescence, PRI and canopy temperature for water stress detection in cereal crops. *International Journal of Applied Earth Observation and Geoinformation* 30(0): 167-178.

[9] Rascher, U., Alonso, L., Burkart, A., Cilia, C., Cogliati, S., Colombo, R., Damm, A., Drusch, M., Guanter, L., Hanus, J., Hyvärinen, T., Julitta, T., Jussila, J., Kataja, K., Kokkalis, P., Kraft, S., Kraska, T., Matveeva, M., Moreno, J., Muller, O., Panigada, C., Pikl, M., **Pinto, F.**, Prey, L., Pude, R., Rossini, M., Schickling, A., Schurr, U., Schüttemeyer, D., Verrelst, J., Zemek, F.. Global Change Biology paper (*in press)*.

[10] Rascher U., Blossfeld, S., Fiorani, F., Jahnke, S., Jansen, M., Kuhn, A., Matsubara, S., Märtin, L., Merchant, A., Metzner, R., Müller-Linow, M., Nagel, K., Pieruschka, R., **Pinto, F**., Schreiber, C., Temperton, V., Thorpe, M., van Dusschoten, D., van Volkenburgh, E., Windt, C., Schur, U. (2011), Non-invasive approaches for phenotyping of enhanced performance traits in bean. *Functional Plant Biology* 38(12), 968-983.

[11] Römer, C., Wahabzada, M., Ballvora, A., **Pinto, F**., Rossini, M., Panigada, C., Behmann, J., Léon, J., Thurau, C., Bauckhage, C., Kersting, K., Rascher, U., Plümer, L. (2012), Early drought stress detection in cereals: Simplex Volume Maximization for hyperspectral image analysis, *Functional Plant Biology* **39**(11), 878-890.

In preparation:

[12] **Pinto, F**., Reynolds, M. (2017). Application of NDVI to correct for spatial variation in large trials in the context of wheat breeding and physiological pre-breeding.

CONFERENCE/WORKSHOP PROCEEDINGS

[1] Pinto, F., Cogliati S., Colombo, R., Damm, A., Müller-Linow, M., Panigada, C., Rossini, M., Schickling, A., Rascher, U. Mapping of sun- induced chlorophyll fluorescence at canopy scale using co-registration of hyperspectral and 3D stereo images. The 5th International Workshop on Remote Sensing of Vegetation Fluorescence, 22-24 April 2014, Paris (France). Oral presentation.

[2] Pinto, F., Cogliati S., Colombo, R., Damm, A., Müller-Linow, M., Panigada, C., Rossini, M., Schickling, A., Rascher, U. Mapping of sun- induced chlorophyll fluorescence at canopy scale using co-registration of

hyperspectral and 3D stereo images. 'CROP.SENSe.net Symposium, 29 Sept- 01 Oct 2014, Bonn (Germany). Oral presentation

[3] Pinto, F., Cogliati S., Colombo, R., Damm, A., Müller-Linow, M., Panigada, C., Rossini, M., Schickling, A., Rascher, U. Mapping of sun- induced chlorophyll fluorescence at canopy scale using co-registration of hyperspectral and 3D stereo images. The 8th EARSeL SIG Imaging Spectroscopy workshop, 8-10 April 2013, Nantes (France). Oral presentation

[4] Pinto, F., Müller-Linow, M., Rascher, U. Remote sensing of photosynthetic efficiency using sun-induced chlorophyll fluorescence signal obtained by a hyperspectral imaging method. The 3rd workshop for CROP.SENSe.net, 26-28 September 2011, JKI- Geilweilerhof (Germany). Oral presentation.

[5] Pinto, F., Rascher, U. Remote sensing of photosynthetic efficiency in four different crop varieties using hyperspectral and sun-induced chlorophyll fluorescence imaging method. Workshop on Remote Sensing Methods for Change Detection and Process Modeling, 18.-19 November 2010, Köln (Germany). Poster presentation.

[6] Pinto, F., Rascher, U. Remote sensing of photosynthetic efficiency in four different crop varieties using hyperspectral and sun-induced chlorophyll fluorescence imaging method. CROP.SENSe.net workshop, 4-5 October, Forschungszentrum Jülich (Germany). Poster presentation.

[7] Pinto, F., Rascher, U. Remote sensing of photosynthetic efficiency in four different crop varieties using hyperspectral and sun-induced chlorophyll fluorescence imaging method. The 3rd Conference on Precision Crop Protection, 19 - 21 September 2010, Bonn (Germany). Poster presentation.

[8] The 4th International Workshop on Remote Sensing of Vegetation Fluorescence, 15-17 November 2010, Valencia (Spain). Attendant.

[9] Pinto, F., Panigada, C., Rossini, M., Röhlen, M., Meroni, M., Rascher, U. Remote sensing of photosynthetic efficiency in three different crops species using hyperspectral and sun-induced chlorophyll fluorescence imaging method. The 7th EARSeL SIG Imaging Spectroscopy workshop, 11-13 April 2011, Edinburgh (Scotland). Oral presentation.

TEACHING EXPERIENCE

- Training on Remotes Sensing and High-throughput phenotyping platforms in the Basic Wheat Improvement Course (BWIC)

- Workshop: “Measuring photosynthesis from photosystem to ecosystem”. Marie Curie Training Network “Harvest”. 11-14 September 2011. University of Nottingham, Sutton Bonington, UK. Oral presentation: “Remote sensing of sun- induced chlorophyll fluorescence”

- Module: “Ecophysiology of Photosynthesis”. Faculty of Mathematics and Natural Science, Düsseldorf University. Winter semester from 2010 to 2012. Professor Dr. Uwe Rascher. Assistant for teaching PAM fluorometry and practical work in the field.

- Training and Networking Activity School in Plant Phenotyping (ETNA School). ICG3-Phytosphere, Research Center Jülich, 1-10 November 2009, Jülich (Germany). Assistant in the practical module of hyperspectral imaging.

KEY SKILLS AND COMPETENCES

- Advanced knowledge of spectroscopy and imaging spectroscopy techniques for remote sensing of vegetation.
- Advanced knowledge in techniques for passive measurement of sun-induced chlorophyll fluorescence.
- Good command in technical aspects of airborne sensor operation.
- Advance knowledge in IDL
- Intermediate knowledge of R
- Advanced knowledge of leaf level measurements of photosynthesis (Gas exchange and active fluorometry).
- Good command in laboratory techniques for extraction and measurement of pigments, phenolic compounds and genetic material.

LINGUISTIC SKILLS

- **Spanish:** Mother Tongue.
- **English:** Fluent in both spoken and written.
- **German:** Good command in both spoken and written.

AWARDS AND DISTINCTIONS:

2009-2013	DAAD-CONICYT PhD scholarship
2008	Universität Hannover Interexchange scholarship to stay at the Institut für Botanik.
2003	University of Chile Distinction “Best student of 2003 promotion”.
2002	Andes Foundation scholarship. “Program for Training in High Technology Centers”. Award to the best students from Chilean Universities for studies abroad.

TRAINING ACTIVITIES:

2008	Research stay at the Institute of Botany, University of Hannover, Hannover, Germany. Subject: Study of ELIP expression during grapevine leaf senescence. Supervisor: Dr. Achim Gau.
2003	Research stay at the Institute of Industrial Fermentations (IFI), Spanish National Research Council (CSIC), Madrid, Spain (3 month). Subject: Characterization of phenolic compounds in berries of Merlot cultivar from two different zones of Spain. Supervisors: Dra. Begoña Bartolomé and Dr. Alvaro Peña. Founded by: Andes Foundation, Chile.
2002	Research Stay at the Laboratory of Oenology, Faculty of Agronomy Sciences, University of Chile, Subject: Analysis of phenolic compounds in grapevine berries and wine. Advisor: Dr. Ing. Agr. Álvaro Peña.