

The "Environmental Microbiology" Group at CIBNOR, Mexico
and
Bashan Institute of Science, USA

Final 2016

(Numbers in parenthesis adjacent a journal's name are the impact factor, 2015)

SUMMARY

- Original publications in peer-reviewed journals with <u>Impact factor</u>	
- Published and "in press" -	15
- Submitted papers -	5
- Submitted patent	1
- Publications of chapter in book -	1
- Industrial Newsletter	1
- Final technical reports for funding agencies	1
- Invited presentations at conferences/seminars	4
- Voluntary presentation at conferences	1
- Active projects	4
- Submitted new projects	6
- Review of manuscripts for International and National journals and funding agencies	65
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- Total productivity (without conferences, reviews, and reports) for 2016:	23

- **Average "Impact Factor" of all published papers in 2016: 3.033**

**Published and "in press" publications in peer-reviewed journals
with an impact factor: 15**

1. Bashan Y., Lopez, B.R., Huss, V.A.R., Amavizca, E. and de-Bashan, L.E. 2016. *Chlorella sorokiniana* (formerly *C. vulgaris*) UTEX 2714, a non-thermotolerant microalga useful for biotechnological applications and as a reference strain. **Journal of Applied Phycology** 28: 113-121 (2.372)
2. Pereg, L., de-Bashan, L.E., and Bashan, Y. 2016. Assessment of affinity and specificity of *Azospirillum* for plants. **Plant And Soil** 399:389–414 (2.969)
3. de-Bashan L.E., Mayali, X., Bebout, B.M., Weber, P.K., Detweiler, A., Hernandez, J.- P., Prufert-Bebout, L., and Bashan, Y. 2016. Establishment of stable synthetic mutualism without co-evolution between microalgae and bacteria demonstrated by mutual transfer of metabolites (NanoSIMS isotopic imaging) and persistent physical association (Fluorescent in situ hybridization). **Algal Research** 15: 179–186 (4.694).

4. Bashan, Y., Kloepper, J.W., de-Bashan, L.E., and Nannipieri, P. 2016. A need for disclosure of the identity of microorganisms, constituents, and application methods when reporting tests with microbe-based or pesticide-based products. **Biology and Fertility of Soils** **52**: 283–284 (3.069)
5. Franklin KA, Sommers PN, Aslan CE, Lopez BR, Bronstein JL, Bustamante E, Burquez A, Medellin RA, Marazzi B. 2016. Plant biotic Interactions in the Sonoran Desert: current knowledge and future research perspectives. **International Journal of Plant Sciences** **177**:217-234 (1.82)
6. Palacios, O.A., Bashan, Y., Schmid, M., Hartmann, A., de-Bashan L. E. 2016. Enhancement of thiamine release during synthetic mutualism between *Chlorella sorokiniana* and *Azospirillum brasilense* growing under stress conditions **Journal of Applied Phycology** **28**:1521–1531 (2.372)
7. Lopez-Lozano, N.E., Carcaño-Montiel, M.G., and Bashan, Y. 2016. Using native trees and cacti to improve soil potential nitrogen fixation during long-term restoration of arid lands. **Plant And Soil** **403**: 317–329 (2.969)
8. Palacios, O.A., Choix, F.J., Bashan, Y., de-Bashan, L.E. 2016. Influence of tryptophan and indole-3-acetic acid on starch accumulation in the synthetic mutualistic *Chlorella sorokiniana*-*Azospirillum brasilense* system under heterotrophic conditions. **Research in Microbiology** **167**: 367–379 (2.561)
9. Posada, L.F., Alvarez, J.C., Hu, C.H., de-Bashan, L.E., and Bashan, Y 2016. Construction of probe of the plant growth-promoting bacteria *Bacillus subtilis* useful for fluorescence *in situ* hybridization. **Journal of Microbiological Methods** **128**: 125-129 (1.857)
10. Bacilio, M., Moreno, M., and Bashan, Y. 2016. Mitigation of negative effects of progressive soil salinity gradients by application of humic acids and inoculation with *Pseudomonas stutzeri* in a salt-tolerant and a salt-susceptible pepper. **Applied Soil Ecology** **107**: 394-404 (2.670)
11. Palacios, O.A., Gomez-Anduro, G., Bashan, Y., de-Bashan, L.E. 2016. Tryptophan, thiamine, and indole-3-acetic acid exchange between *Chlorella sorokiniana* and the plant growth-promoting bacterium *Azospirillum brasilense*. **FEMS Microbiology Ecology** doi: 10.1093/femsec/fiw077 (In press)(3.530)
12. Herrera, H., Valadares, R., Contreras, D., Bashan, Y., and Arriagada, C. 2016. Mycorrhizal compatibility and symbiotic seed germination of orchids in the Coastal Range and Andes in south central Chile. **Mycorrhiza** (In press) DOI 10.1007/s00572-016-0733-0 (3.252)
13. Bashan, Y., Huang, P., Kloepper, J.W., and de-Bashan, L.E. 2016. A proposal for avoiding fresh-weight measurements when reporting the effect of plant growth-promoting (rhizo)bacteria on growth promotion of plants. **Biology and Fertility of Soils** (In press)(3.069) DOI: 10.1007/s00374-016-1153-1
14. Huang, P., de-Bashan, L. E., Crocker, T., Kloepper, J.W., and Bashan, Y. 2016. Evidence that fresh-weight measurement is imprecise for reporting the effect of plant growth-promoting (rhizo)bacteria on growth promotion of crop plants. **Biology and Fertility of Soils** DOI: 10.1007/s00374-016-1160-2 (in Press) (3.069)

15. Amavizca, E., Bashan, Y., Ryu, C.-M., Farag, M.A., Bebout, B.M., and de-Bashan, L.E. 2016. Remote effects of the plant growth-promoting bacteria *Azospirillum brasilense* and *Bacillus pumilus* on the microalgae *Chlorella sorokiniana*. **Scientific Reports-Nature** (in Press) (5.228)

Chapters in books: 1

16. Bashan, Y., de-Bashan, L.E. and Prabhu, S.R. 2016. Superior polymeric formulations and emerging innovative products of bacterial inoculants for sustainable agriculture and the environment. In: **Agriculturally Important Microorganisms: Commercialization and Regulatory Requirements in Asia**. (eds.): Singh H. B., Sarma B. K. and Keswani C. Chapter 2. Published by: Springer Nature, Singapore. pp. 15-46.

Scientific industrial newsletter: 1

17. Bashan, Y., and de-Bashan, L.E. 2016. Encapsulated formulations for microorganisms in agriculture and the environment. **Bioencapsulation Innovations 5**: 4-5.

Publication in the Internet: 1

18. Bashan, Y., and Medel, A. 2016. In memoriam; Dr. Y.R. Sarma (1942-2016). <http://bashanfoundation.org/Sarma/Sarma.html>

Submitted publications: 5

19. Vital-López, L., Cruz-Hernández, M.A., Ortiz-Pérez, E.L., de-Bashan, L.E., Segoviano-Ramírez, J.C., Mendoza-Herrera, A. 2016. Conventional and genetically modified maize: rhizobacterial communities and spatial distribution of *Azospirillum brasilense* in their rhizosphere. **Biology and Fertility of Soils** (3.069)
20. Cassan, F.D., Coniglio, A., Amavizca, E., Rivera, D., Maroniche, G., Bashan, Y., de-Bashan, L. E. 2016. Potential involvement of type VI secretion system in synthetic mutualism between *Azospirillum brasilense* and *Chlorella sorokiniana*. **Algal Research** (4.694)
21. Lopez, B.R., Hernandez, J.-P., Bashan, Y., and de-Bashan, L.E. 2016. Immobilization in alginate of microalgae cells facilitates isolation of DNA and RNA. **Journal of Microbiological Methods** (1.857)
22. Bacilio M., Moreno, M., Lopez-Aguilar, D. R., and Bashan, Y. 2016. Scaling from the growth chamber to the greenhouse to the field: demonstration of diminishing effects of mitigation of salinity in peppers inoculated with plant growth-promoting bacterium and humic acids. **Applied Soil Ecology** (2.67)

23. Palacios, O.A., Contreras, C.A., Muñoz-Castellanos, L.N., Gonzalez-Rangel, M.O., Rubio-Arias, H., Palacios-Espinosa, A., Nevárez-Moorillón, G.V. 2016. Monitoring of indicator and multidrug resistant bacteria in agricultural soils under different irrigation patterns. **Agricultural Water Management**. (2.603)

Submitted patent

24. Production of microencapsulation formulation of bio-drugs against viral diseases in aquaculture. Submitted to the Mexican Patent Office. (Results of CONACYT -Fondo sectorial de innovación, FINNOVA project)

Presentations at conferences: 5 (the invitee or the presenter = in bold)

1. **Posada Uribe, L. F.**, Villegas Escobar, V., de Bashan, L. E., Bashan, Y., Correa, J., Romero Tabarez, M. 2016. Banana plant root colonization by PGPR *Bacillus subtilis* EA-CB0575. In: **VI international congress on Banana**. Miami, Fla. 19-22 April 2016.
2. **Bashan, Y.**, and de-Bashan L.E. 2016. Synthetic mutualism between microalgae and plant growth-promoting bacteria for tertiary wastewater treatment. In: **International Conference on Water Microbiology and Novel Technologies**. Chicago, IL, 18-19 July, 2016 (**Key-note speaker and session's chairman**).
3. **de-Bashan, L.E.**, and Bashan. Y. 2016. Creation of synthetic mutualism to improve understanding of the relationships between microalgae and bacteria in fresh water. In: **International Conference on Water Microbiology and Novel Technologies**. Chicago, IL, 18-19 July, 2016 (**Invited speaker and Chief moderator**).
4. **de-Bashan, L.E.**, Romero Lopez, B., Palacios, O, and Bashan, Y. 2016. Interacción entre microalgas y rizobacterias promotoras de crecimiento vegetal (PGPR): aspectos básicos y aplicados. [Interaction between microalgae and plant growth-promoting rhizobacteria (PGPR): basic and applied aspects]. In: 6th National Symposium and 5th International Symposium on Phytopathogenic Bacteria and 2nd Symposium on Beneficial bacteria for Plants. Guadalajara, Mexico, 22-24 September, 2016 (**Invited speaker**).
5. **Bashan, Y.**, de-Bashan, L.E., Lopez, B., Bacilio, M., Garcia, E., Galaviz, C. y Moreno, M. 2016. Bacterias promotoras de crecimiento vegetal y su uso como inoculantes en ambientes extremos. [Plant growth-promoting bacteria and their use as inoculants for extreme environments. In: In: 6th National Symposium and 5th International Symposium on Phytopathogenic Bacteria and 2nd Symposium on Beneficial bacteria for Plants. Guadalajara, Mexico, 22-24 September, 2016 (**Invited speaker**).

Final technical reports for funding agencies

1. **2016 - Final report on the project:** Planta piloto para validación de plataforma biotecnológica de microencapsulado de biofármaco contra enfermedades virales en acuicultura [Pilot plant for validation of biotechnological platform of microencapsulation of bio-drugs against viral diseases in aquaculture]. Presented to: **CONACYT- Fondo sectorial de innovación, FINNOVA. 34 p. and one patent application** (Dr. Luz de-Bashan, PI; Co-PI, Prof. Yoav Bashan and Dr. Umberto Mejia; Participants: Dr. Blanca Lopez; Dr. Grecia Vazquez and M.Sc. Juan Pablo Hernandez).

Domestic outreach and community services

1. **Strategic line of research of CIBNOR.** The use of plant growth-promoting bacteria to solve environmental problems in the desert. (Prof. Yoav Bashan, Dr. Luz de-Bashan, and Dr. Macario Bacilio; Dr. Alejandro Lopez-Cortes) (CIBNOR internal code: P.C. 6.0)

Scientific recognition and international services

2. **Institutional recognition of project.** The finished project “Physiological and molecular mechanisms in establishment and maintenance of mutualism in plants with different partners”, financed by CONACYT (Mexico) was recognized by Centro de Investigaciones Biologicas del Noroeste (CIBNOR) as exemplary and was presented to the Federal Government of Mexico as a “success case” of basic research (28.4.2016; Dr. Luz de-Bashan and Prof. Yoav Bashan)
3. **International advisory committee board, 15th BNF-Non Legume Satellite Symposium.** 25-28.8.2016 Budapest, Hungary. (Prof. Yoav Bashan)
4. **International ranking.** Ranked as #1 of all scientists in Life Sciences in Mexico (Prof. Yoav Bashan). (Rankin Web of Universities; Ranking of scientists in Mexico Institutions according to their Google Scholar Citations public profiles. Fourth edition, November 2016; by: Project ACUMEN European Commission 7th Framework Programme, Capacities, Science in Society 2010. <http://www.webometrics.info/en/node/63>).
5. **Governmental recognition of a project.** The finished project: “Cooperación técnica México-Colombia: Mejoras en los procesos de producción de biofertilizantes aplicados en cultivos de interés agroindustrial en Colombia”, financed by Agencia Mexicana de Cooperación Internacional para el Desarrollo, Secretaria de Relaciones Exteriores and Agencia Presidencial de Cooperación Internacional de Colombia was recognized by Federal governments of Mexico and Colombia as exemplary. It was later presented by the president of Mexico during his speech in the Colombian parliament as a “success case” of binational cooperation between the two countries (Prof. Yoav Bashan and Dr. Luz de-Bashan).

6. **Review of manuscripts** for journals, funding agencies and foreign universities: **Total: 65**

Reviewer	Journal, University or Funding Agency	Country	Number of manuscripts
Yoav Bashan	Trends in Biotechnology	The Netherlands	1
	European Journal of Wood and Wood Products	The Netherlands	1
	European Journal of Soil Biology	The Netherlands	1
	Critical Reviews in Biotechnology	The Netherlands	1
	Algal Research	The Netherlands	2
	Journal of Environmental Management	The Netherlands	1
	Nutrient Cycling in Agroecosystems	The Netherlands	1
	Symbiosis	The Netherlands	1
	Science of the Total Environment	The Netherlands	1
	Plant and Soil	Germany	11
	Biology and Fertility of Soils	Germany	3
	Applied Microbiology and Biotechnology	Germany	2
	Journal of Applied Phycology	Germany	1
	Water Soil and Air Pollution	Germany	1
	Frontiers in Microbiology	USA	4
	The Scientific World Journal	USA	2
	Preparative Biochemistry and Biotechnology	UK	1
	Arid Land Research and Management	UK	2
	International Journal of Molecular Sciences	Switzerland	2
	Brazilian Journal of Microbiology	Brazil	1
Luz de-Bashan	University of California- Los Angeles	USA	1
	Ontario Pork Research proposals	Canada	1
	Czech Science Foundation	Czech Republic	1
	Cantho University	Vietnam	1
	FEMS Microbiology Ecology	UK	2
	Plant and Soil	Germany	2
	Biology and Fertility of Soils	Germany	3
	Journal of Applied Phycology	Germany	2
	Frontiers in Microbiology	USA	1
	Algal Research	The Netherlands	1
Applied Soil Ecology	The Netherlands	1	
European Journal of Soil Biology	The Netherlands	3	
Revista Argentina de Microbiologia	The Netherlands	1	
Botany	Canada	1	
Murdoch University	Australia	1	
Blanca Lopez	Plant and Soil	Germany	2
	Journal of Arid Environments	The Netherlands	1

External research projects:

(total:\$ 2,995,000 pesos)(= US\$ 150,504) (19.9 Mexican pesos = 1 USD).

“Pilot plant for validation of biotechnological platform of microencapsulation of bio-drugs against viral diseases in aquaculture”.

Funding: MN\$ \$2,995,000; Funded by CONACYT (Fondo sectorial de innovación, FINNOVA)

Duration: 2 years (2014–2016)

PI: Dr. Luz de-Bashan

Co-PI: Prof. Yoav Bashan; Dr. Humberto Mejia.

Participants: Dr. Blanca Romero Lopez, MSc. Juan Pablo Hernandez

“Cooperación técnica México-Colombia: Mejoras en los procesos de producción de biofertilizantes aplicados en cultivos de interés agroindustrial en Colombia”

Funding: USD 21,540. Funded by: Agencia Mexicana de Cooperación Internacional para el Desarrollo, Secretaria de Relaciones Exteriores. Agencia Presidencial de Cooperación Internacional de Colombia.

Duration: 2 years (2014-2016).

PI: Prof. Yoav Bashan

Co-PI: Dr. Luz de-Bashan

Participant: M.Sc. Manuel Moreno and Dr. Blanca Romero Lopez

“Establishment and functional optimization of natural and synthetic mutualisms”.

Funding: MN\$ 3,000,000; Convocatoria CONACYT Investigación Científica Básica 2015 – Continuación de Proyecto de Grupo Consolidado –

Duration: 3 years (2016-2018).

PI: Prof. Yoav Bashan

Co-Pi: Prof. Martin Heil CINVESTAV- Irapuato, Dr. Luz de-Bashan

Participantes: Dr. Gabriela Olmedo CINVESTAV- Irapuato, Dr. Blanca Lopez, Dr. Oskar Palacios, CIBNOR.

“Cooperación técnica México-Colombia: Mejoras en los procesos de producción de biofertilizantes aplicados en cultivos de interés agroindustrial en Colombia”

Funding: Agencia Mexicana de Cooperación Internacional para el Desarrollo, Secretaria de Relaciones Exteriores. Agencia Presidencial de Cooperación Internacional de Colombia.

Duration: 2 years (2017-2018).

PI: Prof. Yoav Bashan and Dr. Thelma Castellanos; Dr. Ruth Bonilla

Co-PI: Dr. Luz de-Bashan

Submitted projects: 6

“Endophytic bacteria of the woolly moss (*Racomitrium lanuginosum*): biogeography, ecology and geomicrobiology”.

Funding agency: Icelandic Research Fund (IRF) 2017- Via Bashan Institute of Science - USA

PI: Dr. Oddur Vilhelmsson, University of Akureyri, Iceland

Co-PI: Prof. Yoav Bashan, Dr. Luz E. de-Bashan

“Inoculante microbiano basado en un complejo alga-bacteria para mejorar la calidad de suelos degradados”

Funding agency: CONICYT – Chile, Proyectos Internacionales de Investigacion- Via Bashan Institute of Science - USA

PI: Dr. Cristian Agurto – Universidad de Concepcion, Chile

Co-PI: Prof. Yoav Bashan, Dr. Luz E. de-Bashan (**Not approved**)

“Desarrollo de una formulación inmovilizada a partir de hidrogeles y consorcio alga-bacteria para recuperar suelos degradados y aumentar la retención de agua en áreas agrícolas de baja productividad”

Funding agency: Fundación para la Innovación Agraria, Ministerio de Agricultura, Chile- Via Bashan Institute of Science - USA.

PI: Dr. Mauricio Schoebitz, Universidad de Concepcion, Chile

Co-PI: Prof. Yoav Bashan, Dr. Luz E. de-Bashan (**Not approved**)

"Establishment and maintenance of synthetic mutualism between microalga and plant growth promoting bacteria”

Funding agency: National Science Foundation (NSF), USA- via Bashan Institute of Science - USA

PI: Dr. Luz de-Bashan

Co-PI: Prof. Yoav Bashan (BIS), Dr. David Blerch, Dr. Andres Carrano Auburn University

Participante: Dr. Blanca Lopez; Dr. Oskar Palacios (CIBNOR) and Dr. Fabricio Cassan (University of Rio Cuarto, Argentina)

“Genomic insights into a synthetic mutualism between *Chlorella sorokiniana* and *Azospirillum brasilense*”. (**Not funded**)

Funding agency: National Science Foundation (NSF), USA- Via Bashan Institute of Science - USA

PI: Dr. Luz de-Bashan

Co-PI: Prof. Yoav Bashan, Prof. Mark Liles Auburn University

Participante: Dr. Blanca Lopez; Dr. Oskar Palacios; Dr. Gracias Gomez-Andoro; Dr. Xavier Mayali, Dr. Octavio Perez-Garcia

“Investigation of stresses produced during inoculant formation to improved susthetic inoculant for agricultura and the environment”.

Funding agency: National Science Foundation (NSF), USA- Via Bashan Institute of Science - USA

PI: Dr. Luz de-Bashan

Co-PI: Prof. Yoav Bashan, Ass. Prof. Yi Wang Auburn University

Participants: Dr. Blanca Lopez; Dr. Oskar Palacios

Team 2016

(SNI-National academic ranking according to the National Research System of Mexico; Candidate<1< 2< 3; H-index and citations according to Google Scholar, January 2, 2017)

Researchers (full time)

1. Dr. Luz Gonzalez de-Bashan (SNI level 2; **H-index-34**; Citations- 6,395; life-time, average Impact factor_{61 publication}- 3.084)
2. Prof. Yoav Bashan (SNI level 3; **H-index-69**; Citations- 17,039; last 5 years, average Impact factor_{41 publication}- 3.002)

3. Dr. Macario Bacilio (SNI level 1)

Research Associate (full time)

4. Dr. Blanca Lopez (SNI level 1, H-index-6; Citations- 176)

Post doctoral fellows

5. Dr. Oskar Palacios (full time) (SNI-Candidate; H-index-3; Citations- 43)
6. Dr. Ping Huang (Part time- In the USA)

Research staff (full-time)

11. M.Sc. Juan-Pablo Hernandez (To March 31, 2016) (SNI level 1; H-index-20; Citations- 1,892)
12. M.Sc. Manuel Moreno (H-index-10; Citations- 971)
13. M.Sc. Edisa Garcia (to May 31, 2016).

Graduate students (Research, full time)

14. M.Sc. Alejandro Figueroa. D.Sc. Student, since 2013. (CIIDIR-IPN), Guasave, Sinaloa, Mexico (With Dr. Luz de-Bashan).

Webmasters

15. M.Sc. Juan-Pablo Hernández (Webmaster-in-Chief to March 31, 2016)
16. Dr. Afonso Medel (Webmaster-in-Chief since April 1, 2016).
17. M.Sc. Edisa Garcia (Assistant webmaster to May 31, 2016)
18. M.Sc. Claudia Contreras (Assistant webmaster since July 1, 2016)

International and national collaborations in 2016

(in: projects, publications and supervising of graduate students in chronological order of cooperation)

1. Prof. Hani Antoun. Laval University, Quebec (Canada). Water Bioremediation. (not active in 2016)
2. Dr. S.R. Prabhu, TerraBioGen Technologies. Vancouver (Canada). Diazotrophic bacteria.
3. Prof. Anton Hartmann. German Research Center for Environmental Health, München (ret.), (Germany). Plant-bacteria interactions.
4. Prof. Martin Heil, CINVESTAV (Guanajuato, Mexico). Mutualism between microalgae and bacteria.
5. Dr. Alberto Mendoza- CBG-IPN, Reynosa, Tamaulipas (Mexico). Colonization of *Azospirillum*.
6. Prof. Gustavo Hernandez-Carmona, IPN-CICIMAR, La Paz, (Mexico). Alginate formulations. (not active in 2016)
7. Prof. Joseph Kloepper, M.Sc. John McInroy and Dr. Ping Huang, Auburn University, Auburn (USA). PGPB/PGPR.
8. Prof. Gabriela Olmedo, CINVESTAV (Guanajuato, Mexico). Mutualism between microalgae and bacteria.
9. Dr. Fabricio Cassan. University of Rio Cuarto, (Argentina). Attachment process in plant growth-promoting bacteria.
10. Dr. Gracia Gomez – CIBNOR (Mexico). Genetic manipulation of microalgae.
11. Prof. Ann Hirsh, University of California-Los Angeles (USA). Microorganisms of the desert.
12. Dr. Choong-Min Ryu. Korean Institute of Bioscience and Biotechnology, Daejeon, (Korea). Volatiles in *Azospirillum*.

13. **Dr. S. Y. Park.** Korean Institute of Bioscience and Biotechnology, Daejeon, (**Korea**). Molecular biology of desert bacilli. (not active in 2016)
14. **Prof. Rainer Borriss.** Humboldt University (**Germany**). Molecular biology of desert bacilli. (not active in 2016)
15. **Dr. Alan Pamella.** Laboratorio Farroupilha. (**Brazil**). Improvements of commercial inoculants.
16. **Dr. Cesar Arriagada.** University of la Frontera (**Chile**). Endophytic microfungi.
17. **Dr. Lily Pereg.** University of New England, (**Australia**). Specificity and affinity of *Azospirillum* for plants.
18. **Dr. Valeska Villegas Escobar.** Universidad EAFIT, Medellín (**Colombia**). Detection of *Bacillus subtilis* by FISH.
19. **Dr. Brad Bebout.** NASA-Ames, California (**USA**). Interactions among microalgae and bacteria.
20. **Dr. Xavier Myali.** Lawrence Livermore National Laboratory, California (**USA**). Study of microalgae-bacteria interaction using nanoSIMS.
21. **Dr. Peter Weber.** Lawrence Livermore National Laboratory, California (**USA**). Study of microalgae-bacteria interaction using nanoSIMS.
22. **Dr. Octavio Perez-Garcia.** University of Auckland, (**New Zealand**). Heterotrophic and Mixotrophic growth of microalgae; metabolic modeling
23. **Dr. Volker Huss.** University of Erlangen-Nürnberg (**Germany**). Systematics of *Chlorella*.
24. **Dr. Walter Osorio.** (**Colombia**) Universidad Nacional de Colombia. PGPB and P fertilization.
25. **Dr. Cristian Agurto.** University of Concepcion. (**Chile**). Biotechnology of microalgae.
26. **Eng. Jorge Farias.** (**Chile**) University of Concepcion. Biotechnology of microalgae.
27. **Prof. Roberto Riquelme** (**Chile**) University of Concepcion. Modeling of microalgae growth.
28. **Dr. Mauricio Schoebitz** (**Chile**) University of Concepcion. Restoration of forests.
29. **Dr. Ruth Bonilla,** CORPOICA (**Colombia**). Improvement of bacterial inoculants.
30. **Dr. Oddur Vilhelmsson** (**Iceland**) University of Akureyri. Endophytes from extreme environments.
31. **Prof. Gabriele Berg,** (**Austria**). Technical University of Graz. Endophytic bacteria
32. **Dr. Armin Erlacher,** (**Austria**). Technical University of Graz. FISH and 3D modeling.
33. **Dr. David Blersch,** (**USA**). Auburn University. Microalgae bacteria interaction.
34. **Dr. Andres Carrano,** (**USA**). Auburn University. Microalgae bacteria interaction.
35. **Dr. Yi Wang,** (**USA**). Auburn University. Inoculants of PGPB.
36. **Prof. Mark Liles** (**USA**) Auburn University. Molecular biology of Microalgae.
37. **Dr. Ali Khalvati** (**Turkey**). Bosphorus University. Mycorrhizae. (**new**)
38. **Dr. Robert Armon** (**Israel**). **Israel Institute of Technology**. Microalgae and energy cells (**new**).
39. **Dr. Camilo Ramirez** (**Colombia**) Universidad de Antioquia. PGPB and degraded soils. (**new**)
40. **Dr. Pilar Ximena Lizarazo** (**Colombia**) Universidad de Antioquia. PGPB and cocoa grains (**new**)
41. **Dr. Jesus Mercado-Blanco** (**Spain**). CSIC-Cordoba. Endophytic bacteria from the desert (**new**).
42. **Dr. Brendan Higgins** (**USA**). Auburn University. Microalgae bacteria interaction (**new**).