UNESCO CHAIR/UNITWIN NETWORK PROGRESS REPORT **FORM**

Title of the Chair/Network:	UNESCO Chair in Biomaterials (364)
Host Institution:	University of Havana, Cuba
Date of establishment of Chair/Network: *(mm, yyyy)*	June, 1998
Period of activity under report: *(mm, yyyy - mm, yyyy)*	April, 2015-March, 2016
Report established by: *(name, position)*	Prof. Dr. Rubén Álvarez Brito, UNESCO Chair holder ruben@fq.uh.cu

To be returned by electronic mail to both: unitwin@unesco.org and i.nichanian@unesco.org

Or by mail to UNESCO, Division for Policies and Lifelong Learning Systems

Section for Higher Education

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1. Executive Summary:

Major outcomes, results and impact of the Chair, including on national policies, in relation to its objectives as stated in Article 2 of the Chair Agreement (between the Institution and UNESCO)
(Not exceeding 300 words)

The UNESCO Chair of Biomaterials of the University of Havana, successfully follows to the main goals by the following targets:

1) Promotion an integrated system of activities of research, training and teaching in the novel science of biomaterials including other related scientific fields.
2) Collaboration between high recognized levels scientists and our research team at the University of Havana strengthen the scientific collaboration with other universities and create a center of research which works in related fields.

The UNESCO Chair of Biomaterials organized several international events in its almost 18 years of existence, benefited a lot of professionals people from the Caribbean, Latin America and Europe with courses, workshops and scientific meetings as the International Courses of Biomaterials in four series. Six series of the International Congress of Biomaterials, four series of the Clinical Applications of Biomaterials and four series of Germany-Cuba Meetings.

The Chair has a team of teachers from its Associates Institutions. The members of this team come from Germany, Argentina, Brazil, Canada, Colombia, China, Cuba, Spain, United States, Netherlands, Ireland, Israel, Italy, Japan, Mexico, Portugal, United Kingdom, Turkey and Venezuela.

This altruist collaboration is an example of the scope achieved by the Chair as a result of its very intensive work. The Chair has collaborated with some International Network CYTED and has developed and participated in some International research projects.

The Latin America Group of Clinical and Research Application of Biomaterials (GLAICB) organized its annual International Course to evaluate the advances of the science of biomaterials.

The UNESCO Chair of Biomaterials has achieved a leading role in the field of spreading the importance of biomaterials. Courses, workshops and scientific congress make also a good contribution to increase the culture [including environment] as a whole.

2) Activities:

Overview of activities undertaken by the Chair during the reporting period

a) Education/Training/Research

(key education programmes and training delivered and research undertaken by the Chair during the reporting period, target group and geographical coverage)

i) Education (leading to certificate)

Course: Realities and Challenges of the Biomaterials and Implantology.

The course was presented by professionals of the ESI-Barcelona (Escuela Superior de Implantología y Rehabilitación Oral, Barcelona) to attend to the V. International Congress of Stomatology 2015. The course was organized on 9th and 10th of November as a post congress activity. It included different special lessons to expose recent advances of clinical researches related with dental implant, description of clinical cases, surgical techniques and pre-operating and post-surgical* cares of patients. This course allowed a very rich interchange in clinical experiences between physicians and maxillofacial surgeons belonging to the GLAICB group. 47 dentists from different Cuban institutions participated the course.

- Centro de Biomateriales, Universidad de la Habana, Cuba.
- Centro Nacional de Estomatología, La Habana, Cuba.
- Clínica Central "Cira García", La Habana, Cuba.
- Clínica Docente de Prótesis de Marianao, La Habana, Cuba.
- Clínica Estomatológica "José Martí", Provincia de Pinar del Río, Cuba
- Clínica Estomatológica "Puentes Grandes" , La Habana, Cuba.
- Clínica Estomatológica Docente "Antonio Briones Montoto", Provincia de Pinar del Río, Cuba
- Clínica Estomatológica Docente "XI Festival", Caimito, Cuba
- Clínica Estomatológica Docente de Bauta, Provincia de Artemisa, Cuba.
- Clínica Estomatológica Docente San Antonio de los Baños, Provincia de Artemisa, Cuba.
- Facultad de Estomatología, La Habana, Cuba.
- Filial Estomatológica Provincia de Pinar del Río, Cuba
- Hospital "Luis Díaz Soto", La Habana, Cuba.
- Policlínico Docente "Camilo Cienfuegos", La Habana, Cuba.

Participants: 47, Male: 14, Female: 33

Participants of the Course Current Affairs and Challenges of the Biomaterials and Implantology.

Course: Biomaterials Updating

The course was organized as part of the XX. CENAEST Scientific Workshop "Santa Apolonia" on 11th of February 2016. The main topics were dedicated to "Advances in Biomaterials - Uses and Researches". There was presented eight conferences concerning to progress of biomaterial's field in the Odontology.

Participants: 74, Male: 19, Female: 55

ii) Training (short term)

Course: Training and Theoretical Course: Biomaterials in the Clinical Implantology

The course was organized at National Center of Odontology (CENAEST), Cuba with 32 lesson's hours from 26th of November 2015 until 4th of January 2016. It included theoretical and practical

	lessons. The main training lessons covers*: - selection of candidates for dental implants, - planning and carry out of the surgical procedures of selected clinical cases, - following to clinical surgical cases, - discussion of clinical evolution. Participants: 10, Male: 4, Female: 6
iii) Research	**Tutoring:** • Coursework Duration: 1 year, 9 students (Male: 3, Female: 6), national coverage. • Diploma Duration: 1 year, one student graduated in Biomedical Engineering (Male: 0, Female: 1), national coverage. • Master Approximate duration: 2 years, one graduated student was tutored by Chair staff of biomaterials, (Male: 1, Female: 0), national coverage. • Ph. D. Dissertation: 2 graduated students were tutored by Chair staff of biomaterials (Male: 0, Female: 2), national coverage. **Projects:** 1. Development of ceramic biomaterials for tissue engineering and bone regeneration. PNCB. National l Program of Basic Sciences. Duration: 2014 - 2017. Supervisor: J.A. Delgado. 2. Interaction of nano-structural materials with biological media. PNCB of Exact Sciences. Supervisor: R. M. Guerra Bretaña. 3. Development of new formulations of acrylic bone cements for biomedical applications. PNCB of Exact Sciences. Duration: 2015 - 2018. Supervisor: L. Morejón Alonso. 4. Development and characterization of dental biomaterials. Supervisor: Y. Veranes Pantoja. 5. Quality management system for designing and marketing university products. Supervisor: R. M. Guerra Bretaña. 6. Development of advanced technologies for designing biomaterials and their production. PNCB of Exact Sciences. Supervisor: Y. Veranes Pantoja. 7. Obtaining biodegradable microparticles of polymer by gelification in situ for control drugs delivering. PNCB de Ciencias Exactas. Duration: 2015 - 2018. Supervisor: C. Peniche. Status: approved. 8. Nanotechnological design and application of a new type of biomaterial scaffolds with specific cell-binding functions to support the growth of embryonic stem cells. Supervisor: Dionisio Zaldívar Silva. 9. Biological evaluation of chitosan-hydroxiapatite based composites for bone reparations. CAPES-MES. Duration: 2012 – 2016. Supervisor: C. Peniche. 10. Synthesis and characterization of new nanobiomaterials from polylactic acid/poly(acryloiloxietil-trimetilammoniun-co-metacrylate of 2-hidroxyetil chloride) and sodium alginate. CAPES-MES. Duration: 2012 – 2016. Supervisor: Dionisio Zaldívar Silva. 11. Development of nanostructural composites for applications in engineering of bone tissues. CNPq. Duration: 2012 – 2014. Supervisor: R. M. Guerra Bretaña. 12. Development of nanostructuralbioceramics for regeneration of bones and tissue engineering. CNPq. Duration: 2012 – 2014. Supervisor: J. A. Delgado. 13. Development and evaluation of composites and scaffold 3-D fibers of polylactic acid with particles of bioactive glasses for bone regeneration. CAPES-MES. Duration: 2013 - 2015. Supervisor: L. Morejón. 14. Impact of ceramics nanoparticles and nanomaterials in the differentiation of parent cells. CAPES-MES. Supervisor: R. M. Guerra Bretaña. 15. Development of nanocomposites of modified cellulose. CAPES-MES. Duration: 2014-2016. Project Chief: Y. Veranes Pantoja. 16. Desenvolvimento de um substituto nanoestruturado a ser utilizado em associação com células-tronco para a terapia vascular em casos de doença arterial periférica. Subproyecto3 (CNPq) of the Red de Terapia Celular y Nanomedicina: Estudos translacionais a través do uso de células-tronco e biomateriais nanoestruturados e funcionalizados para o tratamento de doenças arteriais periféricas, lesão da medula espinhal e queimadura. Facultad de

	Farmacia, Rio Grande do Sul, Brasil. Duration: 2013-2015. Supervisor: Dionisio Zaldívar Silva 17. Compósitos de fosfatos de cálcio e polímeros nanoestruturados para a bioengenharia tecidual óssea Hazel Peniche, Yaimara Solís. Supervisor: Carlos Peniche. CNPq. 18. Ceramic granulated biograft-G for bone implantology. Supervisor: J. A. Delgado García-Menocal. **Networks:** • Red Universitaria de Materiales, Dispositivos y Medicamentos. BIOMAT • Red Universidad de La Habana: Biotecnología y Biomedicina. Faculty of Biology • Red Universidad de La Habana de Medio Ambiente. CIM

b) Conferences/Meetings

(key conferences and meetings organized by the Chair or to which its Chairholder contributed)

i) Key conferences and workshops hosted by the Chair

1. V. International Congress of Stomatology 2015,
2th – 6th of November 2015, Palacio de Convenciones, Havana, Cuba.

Two main activities:

- III. Meeting Cuba-Germany of Odontology as a Latin America-Germany meeting
- V. Meeting of the Latin American Group on Research and Clinical Applications of Biomaterials (GLAICB)

III. Meeting Cuba- Germany of Odontology as a Latin America-Germany meeting
(4th of November 2015)

Members of biomaterials UNESCO Chair assumed important tasks in the organization of the congress:

- Dr. Rubén Álvarez Brito (Chair coordinator) and Dr. Luis Soto Cantero integrated the Organizing committee.
- Dr. Wolf-Dieter Müller (Chair coordinator), Dra. Alicia Granados Martínez and Dr. Joaquín Urbizo Vélez integrated the Scientific committee.

III. Meeting Cuba- Germany of Odontology attended people from different German institutions like Dr. Wolf-Dieter Müller, chair coordinator (Humboldt University) and prof. dr. James Kirkpatrick (Institute of Pathology at the University Medical Center of the Johannes Gutenberg University in Mainz). In general the conference included the participation of six German researchers with extraordinary experts in the biomaterials field for Odontology applications and five Cuban professionals who gave lectures in selected and current topics. Activity with the students of the Faculty of Odontology was organized where they had the opportunity to share the knowledge and thoughts with German specialists. This activity was an important contribution of UNESCO Chair.

V. Meeting of the Latin American Group on Research and Clinical Applications of Biomaterials (GLAICB)
(5th of November 2015)

Professionals from Spain, Argentina, Uruguay and Cuba attended the V. Meeting of the GLAICB organized in Havana. Eight oral presentations and a successfully discussion between them were presented. Professionals, surgeons and representatives of the Cuban Health Public Ministry, Cuban National Regulatory Agency for medical devices and Cuban government opened up a rich debate related to different topics, future tasks and main work targets of the GLAICB.

2. IX. Congress of Chemical Sciences, Technology and Innovation – ''Quimicuba'' 2015

Members of the UNESCO Biomaterials Chair participated in the organization of the "Materials and Biomaterials Sessions" which was part of IX. Congress of Chemical Sciences, Technology and innovation ''Quimicuba'' 2015, which took place on 13th – 16th of October 2015 at Hotel Meliá Habana, Havana, Cuba. The main target was to promote and exchange knowledge on the most recent advances, emphasizing all multi- and interdisciplinary fields related to biomaterials and materials topics.

Around 70 participants attended our sessions which included plenary lectures, oral presentations and posters.

The plenary lecture was performed by prof. dr. Conrado Aparicio from Minnesota Dental Research Center for Biomaterials and Biomechanics, USA, entitled: *"Biomimetic Mineralization of Elastin-like Recombinamers: A Versatile System for Obtaining Hybrid Nanocomposites".*

Three professors of the UNESCO Biomaterials Chairs were presented oral conferences:

- Dr. Martin van Griensven, University of München, Germany,
- Dra. Elizabeth Rosado, Technique University of München, Germany,
- Dr. José Ángel Delgado García-Menocal, Universidad de La Habana, Cuba.

ii) Other conferences/organizational activities undertaken by the Chairholder

Parallel to the program of **III. Meeting Cuba-Germany of Odontology** was delivered a conference with 150 Cuban students of Odontology. Professors of German institutions delivered lectures at the Cuban Faculty of Odontology activity catalogued without precedents by the student attendance:

- Dr. Wolf-Dieter Müller from Dental Materials and Biomaterial Research Department of Prosthodontics, School of Dentistry. Charité-University Medicine Berlin (Chair Coordinator and guest professor at the University of Havana),
- Prof. Dr. James Kirkpatrick from Institute of Pathology at the University Medical Center of the Johannes Gutenberg, University in Mainz, Germany,
- Prof. Dr. Ralf J. Radlanski from the Center of Dental and Craniofacial Sciences, Department of Craniofacial Developmental Biology, Charité-University Medicine Berlin.

Conference for students of Odontology

iii) A selection of conference presentations by the Chairholder and other colleagues

- Dr. Rubén Álvarez Brito, Plenary Conference: “Alkyl cyanoacrylates as nanoparticules and nanofibers”, Second International Congress of Nanoscience and Nanotechnology”, Quito, Ecuador, November 19, 2015.

- Chitosan in Biomedicine. From Gels to Nanoparticles. C. Peniche, 4º OBI, 4ª Edição do Wokshop de Engenharia de Tecidos e OrgãosArtificiais, Campina Grande, Brasil, 19-22 agosto 2015.

- 9 Congress presentations abroad and 58. Congress presentations in Cuba.

c) Interuniversity Exchanges/Partnerships

(principal exchanges/partnerships between the Chair and other institutions including UNESCO Chairs/UNITWIN Networks)

Networks

- Ibero American Network of New Materials for the Design of Advanced Drug Delivery Systems in High Socioeconomic Impact Diseases (RIMADEL-CYTED). Beginning: January 2011. Duration: 48 months. Participant: C. Peniche.

Other interuniversity exchanges:

- Instituto Politécnico Nacional de México (IPN)/Centro de Biomateriales, Cuba. 1 researcher.
- Universidad de Guadalajara (UdG), México/Centro de Biomateriales, Cuba. 1 researcher.
- Instituto Nacional de Tecnología (INT), Rio de Janeiro, Brasil/Centro de Biomaterials. 2 researchers.

d) Publications/Multimedia Materials

(major publications and teaching/learning materials)

Please tick relevant fields of output and indicate volume of output:

	[tick]	[no.]
Books		
Books (edited)		
Books (chapters)	**x**	**1**
Monographs	**x**	**1**
Research Reports	**x**	**5**
Journal Articles (refereed)	**x**	**16**
Conference Proceedings	**x**	**2**
Occasional Papers	**x**	**5**
Teaching/Learning Materials		
Multimedia Materials (CD-Rom)		
Multimedia Materials (Video)		
Multimedia Materials (Other)		

Give details of major publications and materials including full citations.

i) Theses

Doctoral Thesis

1. Student: Lissette Agüero Luztonó. Estudio de la polimerización radicálica por transferencia de átomos de monómeros hidrofílicos y obtención de una matriz soporte para la liberación controlada de moléculas bioactivas. Tutor: Dr. D. Zaldivar Silva.

2. Student: Mayté Paredes Zaldívar. Obtención y caracterización de nuevos materiales híbridos orgánicos-inorgánicos para usos biomédicos. Tutor: Dr. Carlos Peniche.

Master Theses

3. Student: Guillermo Valdés Mesa. Gestión de riesgos en el Centro de Biomateriales. Tutor: Dra. C. Amisel Almirall.

ii) Publications

Web of Science and SCOPUS

1. R.M. Guerra Bretaña, M.C. MeizosoValdés, J.R. Ramirez. Influence of the Quality Infrastructure in the Development of Medical Technologies. IFMBE Proceedings 49, 746-49, 2015.
2. M.C. Pérez, J.A. Delgado, A. Alfonso, R. M. Guerra, J.A. Rodríguez, L. Morejón, D.M. Márquez; A. Beltrán, A. Almirall. Pre-prostheticRemodeling of AlveolarRidgeUsing Calcium Phosphate Biomaterials. IFMBE Proceedings 49, 208-10, 2015.
1. L. Agüero, D. Zaldívar, L. Peña, Y. Solís, J.A. Ramón, Marcos L. Días. Preparation and characterization of pH-sensitive microparticles based on polyelectrolyte complexes for antibiotic delivery. Polymer Engineering and Science, Vol. 55, No. 5, 981-987, 2015.
2. D. Correa, A. Almirall, R. García-Carrodeguas, L.A. dos Santos, A.H. de Aza, J. Parra, L. Morejón, J.A. Delgado. α-Tricalcium phosphate cements modified with β-dicalcium silicate and tricalcium aluminate: Physicochemical characterization, in vitro bioactivity and cytotoxicity. Journal of Biomedical Materials Research: Part B - AppliedBiomaterials, 103B:72-83, 2015.
3. J.A. Delgado, L. Morejón, J. do Nacimento, K.P. Macedo, A. Antunes, M. Varella, A. Alfonso, S. Martínez, M. García-Vallès. Sintering Behavior of Nanostructured Hydroxyapatite Ceramics. Key Engineering Materials, Vol. 631, 207-211, 2015.
4. J. do Nascimento, K.P. Macedo, A. Antunes, J.A. Delgado, L. Morejón, M. Varella. Effect of Sonochemical Technique on the Morphology and Crystallinity of Hydroxyapatite Nanoparticles. Materials Science Forum. Scopus. Vol 820, 287-292, 2015.
5. M.A. Ramírez Arrebato, L. Alfonso, P. González, J. Reinerio Fagundo, M. Suarez, C. Melián, T. Rodríguez, C. Peniche. Kinetics of the Demineralization Reaction of Deproteinized Lobster Shells Using CO_2. Journal Renewable Materials, 3: 73-80, 2015.
6. A. Osorio Madrazo, L. David, C. Peniche Covas, C. Rochas, J.L. Putaux, S. Trombotto, P. Alcouffe, A. Domard. Fine Microstructure of Processed Chitosan Nanofibril Networks Preserving Directiona lPacking and High MolecularWeight. CarbohydratePolymers, 131:1-8, 2015.
7. J. García, N. Bada, C. Peniche. Micropartículas de Quitosana Recubiertas con un Complejo Interpolimérico pH Dependiente para Liberación Controlada de Dexametasona. IFMBE Proceedings. Volume 33, 112-115, 2013.
8. M. Rapado, C. Peniche. Synthesis and Characterization of pH and Temperature Responsive poly(2-hydroxyethyl methacrylate-co-acrylamide) hydrogels. Scopus. Polímeros 25, No. 6, 547-555, 2015.
9. L.P. Icart, E.R.F. dos Santos, E.D. Pereira, S.R. Ferreira, V. Saez, J.A. Ramon, M. Nele, J.C.S. Pinto, R.D. Toledo, D.Z. Silva, F.G. Souza Jr. PLA-b-PEG/magnetitehyperthermic agent prepared by Ugi four component condensation. eXPRESS Polymer Letters. 188-203, 2016, 10(3).

Specializing Data Base with international recognizing

10. Guerra Bretaña R.M., Meizoso Valdés M.C., Roque González R. Conceptos e indicadores de calidad en la actividad archivística. Rev. Habanera de Ciencias Médicas.; 14(3):329-336, 2015. SCIELO.
11. Guerra Bretaña R.M., Meizoso Valdés M.C., Roque González R. Normalización y aplicación de los principios de gestión de la calidad en la actividad archivística. Rev. Habanera de Ciencias; 14(4):527-535, 2015. SCIELO.
12. J. García Couce, N. Bada Rivero, O.D. López Hernández, A. Nogueira Mendoza, P.C. Caracciolo, G.A. Abraham, J.A. Ramón Hernández, C. Peniche Covas. Recubrimiento de microesferas de quitosana-ibuprofeno con un complejo interpolimérico pH dependiente. Revista Cubana de Farmacia, 48 (4) 646-657 2014. SCIELO.
13. Hazel Peniche Aguero, Miguel Angel Ramírez Arrebato, Carlos Peniche Covas. El quitosano y su impacto en la Agricultura, Revista de Plásticos Modernos, Vol 109, No. 701, Mayo 2015. Chemical Abstracts

Specializing data base with Latin American recognizing and equivalents

14. D. Correa, A. Almirall, L. Brito, R. García, L.A. dos Santos, A. de Aza, J. Parra, J.Á. Delgado. Cemento de β-Silicato de Dicálcico para Aplicaciones Biomédicas. Revista Tecnología y Ciencia, 26: 32-40, 2014.
15. García Vázquez G., Montesinos Ferrer O. Sosa Vera R.C., Guerra Bretaña R.M. Rediseño de metodología

para la identificación y evaluación de aspectos ambientales. Normalización 1/2015, 16-26.Latindex.

16. Malleza Hierrezuelo C., Fragas Domínguez L., Guerra Bretaña R.M..Metodología para la integración del Sistema de Gestión de la Calidad y el Control Interno en la Empresa Periódicos Granma. Normalización 1/2015, 4-15.Latindex.

Other publications and conference proceedings

17. Lunz, J.N., Licona, K.M., Ribeiro, A.A.; Bastos, I.N., García-Menocal. J.A.D., Alonso, L.M., Oliveira M.V. Dissolution study of nanostructured hydroxyapatite bioceramic. Anais 59º Congresso Brasileiro de Cerâmica, p. 2269-77, 2015.
18. Brizuela N., Correa D., Caldas V., Delgado J.A., García-Vallés M., Martínez S., Morejón L., dos Santos L. A. Fabrication of fibers PLGA/BIOGLASS using the method of electrospinning from polymericsolution. Anais 59º Congresso Brasileiro de Cerâmica, p. 2635-42, 2015.
19. Ramírez J.R., Guerra R.M., García V. Infraestructura de la calidad y desarrollo económico. Situación en Cuba. En: Economía Cubana: Transformaciones y Desafíos, pp.261-290. Ed. Ciencias Sociales, La Habana, 2014.
20. Delgado, J. Á. Biomateriales de fosfato de calcio para aplicaciones biomédicas, Encuentro con la Química, Vol. 1, No 2, 2015, 13-18.
21. Guerra Bretaña R.M., Meizoso Valdés M.C., Ramírez García J.R. La gestión de lainnovaciónenlas empresas cubanas. NC leactualiza 01, 2015, 2-17, ISSN 2309-5253.
22. Y. Solís, N. Davidenko, R.G. Carrodeguas, C. Peniche. Desarrollo de Composites basados em Quitosana/Apatita y Quitosana/Apatita-Silicato como material soporte para Regeneración Ósea. Repositorio Institucional Scriptorium de la Universidad de La Habana, p.128, 2014.
23. Roque González R., Guerra Bretaña R.M., et al. La gestión de lacalidad de las investigaciones y del posgrado académico. Publicado en: IV Jornada Virtual de Educación Médica 2015 Mayo 2015. En: http://www.edumed2015.sld.cu/index.php/edumed/2015/paper/view.Paper/105.
24. Guerra Bretaña R.M., M.C. Meizoso Valdés, M.I. Durán Ramos Importancia de gestionar la calidad en los laboratorios universitarios. Memorias del Congreso Iberoamericano de Calidad em los Laboratorios IBEROLAB. www.iberolab.org.
25. Meizoso Valdés M.C., M.I. Durán Ramos, R.M. Guerra Bretaña. Influencia de las medidas volumétricas em la incertidumbre de la determinación del contenido de fósforo em los materiales fosfato-cálcicos. www.iberolab.org.
26. Ramos Azcuy F.J., MeizosoValdés M.C., Guerra Bretaña R.M. Evaluación del impacto de la capacitación de los Programas de Maestría. Disponible en: monografias.com.
27. Guerra Bretaña R.M., Meizoso Valdés M.C., Ramírez García J.R., Iglesias Morell A. The role of master degreestudies as a knowledge transfer channel between universities and industry in Cuba. Organizationa linnovations as case study. Memorias Globelics 2015.
28. Wong Hernandez L.; Zaldivar Silva D., A. Vera-Cruz. Barriers for the introduction of new products based on biomaterials in the cuban health system: the case of TISUACRYL®. Memorias Globelics 2015.

Monographs

29. C. Jasso, L. Morejón, E. Mendizábal. Bone Cements (Acrylics). Encyclopedia of Biomedical Polymers and Polymeric Biomaterials. April 2, 2015. CRC Press Reference – Taylor & Francis Group.

Books (chapters)

C. Peniche, L. Becherán. Quitosano como plataforma tecnológica en productos biofarmacéuticos y aplicaciones dérmicas. En: Biomateriales aplicados al diseño de sistemas terapéuticos avanzados. H.C. De Sousa, M.E.M. Braga, A. Sosnik (Eds.) Coimbra University Press. 2015, Cap. 3, pp.
111-146. Press version ISBN 978-989-26-0880-8, Digital version ISBN:
978-989-26-0881-5.

e) Cooperation with UNESCO Headquarters, Field Offices

f) Other

(any other activities to report)

Awards

National Award of Cuban Academic of Sciences 2015 (ACC)

1. Title: Sistemas de liberación controlada a partir de biomateriales para la restauración del tejido óseo. Authors: G. Fuentes, Y. Campos, J.A. Delgado, A.I. Almirall, E. Peón, M.L. Rojas, A.M. de Guzzi y colaboradores.

Annual University of Havana Research Award 2015

2. Title: La gestión integrada de la calidad y los riesgos, bases para la eficacia y seguridad de los biomateriales. Authors: R.M. Guerra, M.C. Meizoso, M.C. Pérez, A. Almirall, L. Morejón, J.Á. Delgado, M. Ríos, A. Mishina, G. Valdés.
3. Title: Preparación y caracterización de cementos de α-$Ca(PO_4)_2$ modificados comβ-Ca_2SiO_4 y $Ca_3Al_2O_6$ para restauraciones óseas. Authors: D. Correa, J.Á. Delgado, R. García, L. Alberto Dos Santos y colaboradores.
4. Title: Aplicación de la quitosana en el desarrollo de soportes magneto dirigibles de enzimas y andamiajes bioactivos para ingeniería de tejidos. Authors: H. Peniche Agüero, C. Peniche Covas.

Science and technical FORUM 2015

5. Title: Impactos de la Cátedra de Calidad, Metrología y Normalización de la Universidad de la Habana. Authors: Guerra y cols Premio en Provincial FORUM 2014.
6. Title: Modelo integrador de la gestión del conocimiento operativo y el control de la información documentada en un sistema de gestión de la calidad NC-ISO 9001. Authors: R.M. Guerra Bretaña, A. Hernández, N. Navarro Martínez Alfonso. Relevant Municipal Forum.

3. Future Plans and Development Prospects:

Outline of action plan for the next biennium and short/medium and long-term development prospects. Please do not hesitate to refer to difficulties that the Chair has experienced
(Not exceeding 300 words)

Action Plan of the UNESCO Chair of Biomaterials, University of Havana for the next four years:

2016

- XXV. Anniversary of the Center of Biomaterials of the University of Havana. Scientific activities organized during the year 2016.
- Act to invest Dr. Julio San Román del Barrio as Dr. Honoris Causa of the University of Havana.
- International course of biomaterials.
- 6th Meeting of the Latin America Group of Research and Applications of Biomaterials (GLAICB).
- 4th Meeting Germany-Cuba of Biomaterials in Odontology.
- Some members of the Chair, working in a consultative capacity of research related with Biomaterials.

2017

- 7th Meeting of the Latin America Group of Research and Applications of Biomaterials (GLAICB).
- Managing the 1st Meeting USA-Cuba.

2018

- XX. Anniversary of the UNESCO Chair of Biomaterials. Scientific activities organized during the year 2018.
- VII. International Congress of Biomaterials, Biomat'2018.
- V. International Course of Biomaterials within the Congress Biomat'2018 as an activity before the Congress with the participation of a group of the foreign members of the Chair.
- 8th Meeting of the Latin America Group of Research and Applications of Biomaterials (GLAICB).
- 5th Meeting Germany-Cuba of Biomaterials in Odontology.

2019

- 9th Meeting of the Latin America Group of Research and Applications of Biomaterials (GLAICB).
- International Congress of Odontology'2019, Havana, Cuba, November, 2019.

Permanent tasks

- Increasing the scope of the Chair of Biomaterials including Nanomedicine, a new branch of the novel Science, Nanoscience and Nanotechnology.
- Strengthen the Latin America Group of Research and Clinical Applications of Biomaterials, GLAIC.
- Maintaining and increasing the relationship with the group of high level researcher from Germany who support the traditional meeting Germany-Cuba.
- Spreading the information about the activities of the Chair through the WEB site of Cuban network UNESCO Chairs.

Appendix:

1) Human Resources

- General Coordinator: Dr. Rubén Alvarez Brito, ruben@fq.uh.cu
- *Co-Chair Coordinator*: Dr. Wolf-Dieter Müller
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