



Gerardo Beruvides López

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Date of document: 29/12/2019

v 1.4.0

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Summary of CV

This section describes briefly a summary of your career in science, academic and research; the main scientific and technological achievements and goals in your line of research in the medium -and long- term. It also includes other important aspects or peculiarities.

Gerardo Beruvides is senior manager of AI solution for Smart-Industry and Mobility in Social Innovation Business Unit, Hitachi Europe Ltd., being before industry researcher for Automation and Industry Lab into the Company since 2018. During this time, he has participate in several industrial project for the industrial digitalization of european and international customer, as well as, the research of disruptive AI-based solution for complex industrial cyber-physical systems. Previously, he works as a postdoctoral researcher in the Centre for Automation and Robotics (CAR-UPM-CSIC), Madrid, Spain. He has received his PhD in Informatics and Telecommunications (Cum Laude, International Mention and extraordinary award of PhD programme 2016-2017) from the Autonomous University of Madrid and , award to the best PhD Thesis in Smart Control, from the Smart-Control Group into the Automation Spanish Committe, Spain in 2017. He has obtained a pre-doctoral Researcher Formation Scholarship (FPI) from 2014 to 2017, joining to the Centre for Automation and Robotics of the Spanish National Research Council (CAR-CSIC), Madrid, Spain. During the pre-doctoral period, he has done three international stays in Institute for Production System and Design Technology, Fraunhofer, Germany, in 2015; Warwick Manufacturing Group, United Kingdom, in 2016 and Yokohama Research Laboratory, Hitachi Ltd., Japan, in 2017, carrying out multiples research and industrial activities to develop personal skills in the design and implementations of modeling, optimization, self-decision making techniques to monitoring and control actions on smart manufacturing environments. Furthermore, he has participated in several National and European projects and research contract such as: RA2, CONMICRO, AM.4G, SINTPER and IOSENSE focused on the modeling, simulation, optimization and implementation of artificial cognitive process knowledge-based architectures creating computational intelligence libraries to predict global manufacturing indexes and to evaluate the reliability and accuracy in smart mobility scenarios. Previously, he was graduated with a BSc in Mechanical Engineering, in 2010, and a MD in Computer Aided Engineering, in 2012, from the University of Matanzas, Cuba. He has also worked as an Assistant Professor in the University of Matanzas, Matanzas, Cuba from 2010 to 2014. His research areas are artificial intelligence modelling, multi-objective optimization problems, reinforcement machine learning and cognitive science based on process knowledge to provide self-adaptive and own decision making capabilities to machines, manufacturing processes and industrial connected scenarios without human in the loop.



General quality indicators of scientific research

This section describes briefly the main quality indicators of scientific production (periods of research activity, experience in supervising doctoral theses, total citations, articles in journals of the first quartile, H index...). It also includes other important aspects or peculiarities.

Scopus indexes:

Citations: 155 total by 100 documents

h-index: 8

Subject areas: Computer Science; Engineering; Materials Science; Decision Sciences; Mathematics.

Google Scholar indexes:

Citations: 337

h-index: 11

i10-index: 13

Subject areas: Artificial Intelligence, Cyber-Physical system, Machine Learning, Deep Neural Network, Internet of Things



Gerardo Beruvides López

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Contact country: Germany
Contact aut. region/reg.: Oberbayern
Contact city: Munich
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Current professional situation

Employing entity: Hitachi Europe GmbH **Type of entity:** Business
Department: Social Innovation Business Unit
Professional category: Senior Manager of AI Solutions
City employing entity: Schwaig-Oberding, Oberbayern, Germany
Phone: (49) 812299582 - 433 **Fax:** 812299582 - 40 **Email:** gerardo.beruvides@hitachi-eu.com

Start date: 01/01/2020

Type of contract: Permanent employment contract

Primary (UNESCO code): 120304 - Artificial intelligence; 120305 - Automated manufacturing systems; 120903 - Data analysis; 330406 - Computer architecture; 330417 - Real-time systems; 331101 - Automation technology

Performed tasks: AI solutions for Smart Industry and Mobility environments; Project management, Disruptive AI solution research & development.

Previous positions and activities

	Employing entity	Professional category	Start date
1	Hitachi Europe GmbH	Researcher	01/07/2018
2	Centro de Automática y Robótica (CAR-UPM-CISC)	Post-doctoral researcher	15/10/2017
3	Consejo Superior de Investigaciones Científicas	Investigador en formación (FPI) (pre-doctoral researcher)	01/03/2014
4	Universidad de Matanzas "Camilo Cienfuegos"	Profesor Asistente (Teaching professor)	01/10/2010

1 **Employing entity:** Hitachi Europe GmbH **Type of entity:** R&D Centre
City employing entity: Schwaig-Oberding, Oberbayern, Germany
Professional category: Researcher

**Phone:** (49) 812299582 - 433**Fax:** 812299582 - 40**Email:** gerardo.beruvides@hitachi-eu.com**Start-End date:** 01/07/2018 - 31/12/2019**Duration:** 1 year - 6 months**Type of contract:** Permanent employment contract**Primary (UNESCO code):** 120304 - Artificial intelligence; 120305 - Automated manufacturing systems; 120903 - Data analysis**Performed tasks:** Smart Manufacturing researcher, project manager and customer's solutions deployment**2 Employing entity:** Centro de Automática y Robótica (CAR-UPM-CISC)**City employing entity:** Madrid, Community of Madrid, Spain**Professional category:** Post-doctoral researcher**Start-End date:** 15/10/2017 - 30/06/2018**Duration:** 8 months - 15 days**Type of contract:** Temporary employment contract**3 Employing entity:** Consejo Superior de Investigaciones Científicas**Type of entity:** State agency**Professional category:** Investigador en formación (FPI) (pre-doctoral researcher)**Start-End date:** 01/03/2014 - 22/09/2017**Duration:** 3 years - 6 months - 22 days**4 Employing entity:** Universidad de Matanzas "Camilo Cienfuegos"**Type of entity:** University**Professional category:** Profesor Asistente (Teaching professor)**Start date:** 01/10/2010**Duration:** 4 years



Education

University education

1st and 2nd cycle studies and pre-Bologna degrees

University degree: Higher degree

Name of qualification: Mechanical Engineering

City degree awarding entity: Matanzas, Cuba

Degree awarding entity: Universidad de Matanzas "Camilo Cienfuegos" **Type of entity:** University

Date of qualification: 15/07/2010

Average mark: Excellent

Prize: Special award for degree

Standardised degree: Yes

Date of homologation: 21/09/2015

Doctorates

Doctorate programme: Programa Oficial de Doctorado en Ingeniería Informática y de Telecomunicación

Degree awarding entity: Universidad Autónoma de Madrid **Type of entity:** University

Date of degree: 22/09/2017

European doctorate: Yes

Recognition of quality: Yes

Date of certificate: 22/09/2018

Other postgraduate university studies

Type of education: Masters

Postgraduate qualification: Máster en Ingeniería Asistida por Computadoras

City degree awarding entity: Matanzas, Cuba

Degree awarding entity: Universidad de Matanzas "Camilo Cienfuegos" **Type of entity:** University

Faculty, institute or centre: Facultad de Ingenierías

Date of qualification: 21/12/2012

Obtained qualification: 10 (Sobresaliente)

Standardised degree: No



Attended advanced, improvement and innovative teacher training and new technology courses and seminars focused on improving teaching

Title of course/seminar: Diplomado de Superación para Profesores jóvenes

Goals of the course/seminar: Destinados a desarrollar didáctica, preparación de planes de estudios, fundamentos psicopedagógicos, formas del proceso docente educativo, preparación política y formación curricular

City organizing entity: Matanzas, Cuba

Organising entity: Universidad de Matanzas "Camilo Cienfuegos" **Type of entity:** University

Faculty, institute or centre: Centro de Estudios y Desarrollo Educacional

Duration in hours: 30 hours

Start-End date: 07/06/2013 - 15/07/2013

Language skills

Language	Listening skills	Reading skills	Spoken interaction	Speaking skills	Writing skills
German	A2	A2	A2	A2	A2
English	C1	C1	C1	C1	C1
Spanish	C2	C2	C2	C2	C2

Teaching experience

General teaching experience

- 1 Type of teaching:** International teaching
Name of the course: Industria 4.0
Type of programme: Master's degree
Type of subject: Optional
University degree: Master Ingenieria Asistida por Computadora
Frequency of the activity: 1
Start date: 10/12/2019 **End date:** 10/12/2019
End date: 10/12/2019 **Type of hours/ ECTS credits:** Credits
Hours/ECTS credits: 6
Entity: Universidad de Matanzas
Department: Centro de Fabricacion Avanzada y Sostenible
City of entity: Matanzas, Cuba
- 2 Type of teaching:** Official teaching
Name of the course: Cursos y Conferencias
Related skills: Nociones generales de Industria 4.0. Casos de éxito en Proyectos Nacionales e Europeos
Type of programme: Master's degree **Type of teaching:** In person theory
Type of subject: Optional
University degree: Master Universitario en Automática y Electrónica
Start date: 11/01/2018 **End date:** 15/02/2018
End date: 15/02/2018 **Type of hours/ ECTS credits:** Credits



Hours/ECTS credits: 3

Entity: Universidad Politécnica de Madrid

Type of entity: University

Faculty, institute or centre: Escuela Técnica Superior de Ingenieros Industriales

Department: Automática, Ingeniería Eléctrica y Electrónica e Informática Industrial

City of entity: Madrid, Community of Madrid, Spain

3 **Type of teaching:** Official teaching

Name of the course: Resistencia de Materiales II

Type of programme: Engineering

Type of teaching: In person theory

Type of subject: Core

University degree: Graduado o Graduada en Ingeniería Mecánica

Course given: 3er

Start date: 10/02/2014

End date: 04/07/2014

End date: 04/07/2014

Type of hours/ ECTS credits: Hours

Hours/ECTS credits: 48

Entity: Universidad de Matanzas "Camilo Cienfuegos"

Type of entity: University

Faculty, institute or centre: Facultad de Ingenierías

Department: Departamento de Ingeniería Mecánica

City of entity: Matanzas, Cuba

Subject language: Spanish

4 **Type of teaching:** Official teaching

Name of the course: Resistencia de Materiales I

Type of programme: Engineering

Type of teaching: In person theory

Type of subject: Core

University degree: Graduado o Graduada en Ingeniería Mecánica

Course given: 3er

Start date: 02/09/2013

End date: 31/01/2014

End date: 31/01/2014

Type of hours/ ECTS credits: Hours

Hours/ECTS credits: 64

Entity: Universidad de Matanzas "Camilo Cienfuegos"

Type of entity: University

Faculty, institute or centre: Facultad de Ingenierías

Department: Departamento de Ingeniería Mecánica

City of entity: Matanzas, Cuba

Subject language: Spanish

5 **Type of teaching:** Official teaching

Name of the course: Resistencia de Materiales II

Type of programme: Engineering

Type of teaching: In person theory

Type of subject: Core

University degree: Graduado o Graduada en Ingeniería Mecánica

Course given: 3er

Start date: 04/02/2013

End date: 05/07/2013

End date: 05/07/2013

Type of hours/ ECTS credits: Hours

Hours/ECTS credits: 48

Entity: Universidad de Matanzas "Camilo Cienfuegos"

Type of entity: University

Faculty, institute or centre: Facultad de Ingenierías

Department: Departamento de Ingeniería Mecánica

City of entity: Matanzas, Cuba

Subject language: Spanish



- 6** **Type of teaching:** Official teaching
Name of the course: Resistencia de Materiales I
Type of programme: Engineering **Type of teaching:** In person theory
Type of subject: Core
University degree: Graduado o Graduada en Ingeniería Mecánica
Course given: 3er
Start date: 03/09/2012 **End date:** 01/02/2013
End date: 01/02/2013 **Type of hours/ ECTS credits:** Hours
Hours/ECTS credits: 64
Entity: Universidad de Matanzas "Camilo Cienfuegos" **Type of entity:** University
Faculty, institute or centre: Facultad de Ingenierías
Department: Departamento de Ingeniería Mecánica
City of entity: Matanzas, Cuba
Subject language: Spanish
- 7** **Type of teaching:** Official teaching
Name of the course: Teoría de los Mecanismos
Type of programme: Engineering **Type of teaching:** In person theory
Type of subject: Core
University degree: Graduado o Graduada en Ingeniería Mecánica
Course given: 3er
Start date: 06/02/2012 **End date:** 29/06/2012
End date: 29/06/2012 **Type of hours/ ECTS credits:** Hours
Hours/ECTS credits: 56
Entity: Universidad de Matanzas "Camilo Cienfuegos" **Type of entity:** University
Faculty, institute or centre: Facultad de Ingenierías
Department: Departamento de Ingeniería Mecánica
City of entity: Matanzas, Cuba
Subject language: Spanish
- 8** **Type of teaching:** Official teaching
Name of the course: Ciencia de los Materiales I
Type of programme: Engineering **Type of teaching:** In person theory
Type of subject: Core
University degree: Graduado o Graduada en Ingeniería Mecánica
Course given: 3er
Start date: 05/09/2011 **End date:** 27/01/2012
End date: 27/01/2012 **Type of hours/ ECTS credits:** Hours
Hours/ECTS credits: 48
Entity: Universidad de Matanzas "Camilo Cienfuegos" **Type of entity:** University
Faculty, institute or centre: Facultad de Ingenierías
Department: Departamento de Ingeniería Mecánica
City of entity: Matanzas, Cuba
Subject language: Spanish
- 9** **Type of teaching:** Official teaching
Name of the course: Teoría de los Mecanismos
Type of programme: Engineering **Type of teaching:** In person theory
Type of subject: Core
University degree: Graduado o Graduada en Ingeniería Mecánica
Course given: 3er

**Start date:** 07/02/2011**End date:** 01/07/2011**Hours/ECTS credits:** 56**Entity:** Universidad de Matanzas "Camilo Cienfuegos"**Faculty, institute or centre:** Facultad de Ingenirías**Department:** Departamento de Ingeniería Mecánica**City of entity:** Matanzas, Cuba**Subject language:** Spanish**End date:** 01/07/2011**Type of hours/ ECTS credits:** Hours**Type of entity:** University**10 Type of teaching:** Official teaching**Name of the course:** Dibujo Asistido por Computadora 3D**Type of programme:** Engineering**Type of subject:** Obligatory**University degree:** Graduado o Graduada en Ingeniería Mecánica**Course given:** 3er**Start date:** 01/09/2010**End date:** 28/01/2011**Hours/ECTS credits:** 48**Entity:** Universidad de Matanzas "Camilo Cienfuegos"**Faculty, institute or centre:** Facultad de Ingenirías**Department:** Departamento de Ingeniería Mecánica**City of entity:** Matanzas, Cuba**Subject language:** Spanish**Type of teaching:** Practical work (classroom-problems)**End date:** 28/01/2011**Type of hours/ ECTS credits:** Hours**Type of entity:** University**11 Type of teaching:** Official teaching**Name of the course:** Introducción a la Informática**Type of programme:** Engineering**Type of subject:** Obligatory**University degree:** Graduado o Graduada en Ingeniería Mecánica**Course given:** 1er**Start date:** 01/09/2010**End date:** 28/01/2011**Hours/ECTS credits:** 32**Entity:** Universidad de Matanzas "Camilo Cienfuegos"**Faculty, institute or centre:** Facultad de Ingenirías**City of entity:** Matanzas, Cuba**Subject language:** Spanish**Type of teaching:** Practical work (classroom-problems)**End date:** 28/01/2011**Type of hours/ ECTS credits:** Hours**Type of entity:** University**Experience supervising doctoral thesis and/or final year projects****1 Project title:** Sistema de Monitorización para la Industria 4.0. Un enfoque basado en Sistemas Ciberfísicos.**Type of project:** End of Master project**Co-director of thesis:** Pablo San Segundo Carrillo; Gerardo Beruvides López**Entity:** Universidad Politécnica de Madrid**Type of entity:** University**Student:** Alex Patricio Toapanta Guacapiña**Obtained qualification:** 8(Notable)**Date of reading:** 12/07/2018



- 2** **Project title:** Sistema de Monitoreo de Bajo Costo para Procesos y Sistemas Mecánicos
Type of project: Master thesis
Co-director of thesis: Rodolfo Haber Guerra; Gerardo Beruvides Lopez
Entity: Universidad de Matanzas "Camilo Cienfuegos"
City of entity: Matanzas, Cuba
Student: Alberto Villalonga Jaén
Obtained qualification: 10 (Sobresaliente)
Date of reading: 10/01/2017
- 3** **Project title:** Sistema Experto para la Selección de Parámetros Óptimos en el Microfresado de Ranuras de Ti6AL4V
Type of project: Master thesis
Co-director of thesis: Ramon Quiza Sardiñas; Gerardo Beruvides Lopez
Entity: Universidad de Matanzas "Camilo Cienfuegos"
City of entity: Matanzas, Cuba
Student: Iván La Fe Perdomo
Obtained qualification: 10 (Sobresaliente)
Date of reading: 10/01/2017
- 4** **Project title:** Monitoreo del microtaladrado con herramientas neuro-borrosas
Type of project: End of course project
Entity: Universidad de Matanzas "Camilo Cienfuegos" **Type of entity:** University
City of entity: Matanzas, Cuba
Student: Eric Rubí Cuello
Obtained qualification: 10 (Sobresaliente)
Date of reading: 14/12/2012
- 5** **Project title:** Análisis estadístico de señales para el monitoreo de procesos de microtaladrado
Type of project: End of course project
Entity: Universidad de Matanzas "Camilo Cienfuegos" **Type of entity:** University
City of entity: Matanzas, Cuba
Student: Victor Díaz Lorenzo
Obtained qualification: 10(Sobresalinte)
Date of reading: 10/07/2012
- 6** **Project title:** Propuesta de materiales para la elaboración de pasadores para los paquetes de muelles del Internacional 9700
Type of project: End of course project
Co-director of thesis: Gerardo Beruvides Lopez
Entity: Universidad de Matanzas "Camilo Cienfuegos" **Type of entity:** University
City of entity: Matanzas, Cuba
Student: Machelys Ramos García
Obtained qualification: 8 (Notable)
Date of reading: 15/12/2011



Teaching experience in courses and seminars for university teacher training

Type of event: Seminar

Name of the event: Industria de fabricación. Nociones generales

City organizing entity: Matanzas, Cuba

Organising entity: Universidad de Matanzas "Camilo Cienfuegos" **Type of entity:** University

Aims of the course: Destinado a realizar un resumen de las principales técnicas de mecanizado convencional y no convencional demandados en la industria, así como la interacción de nuevas tecnologías del mundo de la simulación y modelado mecánico con los nuevos escenarios a los cuales se enfrentarán los futuros profesionales

Hours of teaching: 4

Teaching language: Spanish

Teaching date: 11/06/2015

Scientific and technological experience

Scientific or technological activities

R&D projects funded through competitive calls of public or private entities

- Name of the project:** IOSENSE: Embedding intelligence in sensors for Internet of Things

Identify key words: Internet; Cognitive behavior and learning; Software architectures; Storage systems; Intelligent sensors; Sensorial fusion

Type of project: Industrial research **Geographical area:** European Union

Degree of contribution: Researcher

Entity where project took place: Centro de Automática y Robótica (CAR-CSIC) **Type of entity:** Public Research Body

City of entity: Madrid, Community of Madrid, Spain

Name principal investigator (PI, Co-PI...): Rodolfo Haber Guerra

Nº of researchers: 6

Funding entity or bodies:
Ministerio de Economía y Competitividad, ECSEL-JU (European Commission)

Type of participation: Team member

Name of the programme: ECSEL-JU

Code according to the funding entity: 692480

Start-End date: 01/05/2016 - 30/04/2019 **Duration:** 3 years

Participating entity/entities: Consejo Superior de Investigaciones Científicas

Total amount: 395.000 €

Applicant's contribution: IoSense is a European project designed to enable development work on technological as well as application oriented tasks combining with market orientation ("Design to Market Needs"), embedding all required functionality besides sensors. In particular, his contributions are focused on the simulation and implementation of a machine learning library to evaluate the reliability and accuracy of embedded IoT sensor such as: On-board LiDAR in assistant-driving devices in smart mobility scenarios. IoSense aims to cooperate with other highly specialized manufacturing lines and other European pilot lines focusing on different technologies, securing employment and providing answers to the upcoming challenges in the IoT era.

2 **Name of the project:** CONMICRO: Artificial Cognitive Control System for Micromanufacturing Processes. Method and Application

Identify key words: Industrial data processing; Cognitive behavior and learning; Software architectures; Automatization on manufactured industry; Adaptive control; Control of mechanical systems; Intelligent control; Sensorial fusion; Image processing

Type of project: Basic research (including archaeological digs, etc)

Geographical area: National

Degree of contribution: Researcher

Entity where project took place: Centro de Automática y Robótica (CAR-CSIC)

Type of entity: Public Research Body

City of entity: Madrid, Community of Madrid, Spain

Name principal investigator (PI, Co-PI....): Rodolfo Haber Guerra

Nº of researchers: 4

Funding entity or bodies:

Ministerio de Economía y Competitividad

Type of participation: Team member

Name of the programme: Proyectos y Convenios en convocatoria pública competitiva. Plan Nacional I+D

Code according to the funding entity: DPI2012-35504

Start-End date: 01/01/2012 - 30/06/2016

Duration: 3 years - 6 months

Participating entity/entities: Consejo Superior de Investigaciones Científicas

Total amount: 83.000 €

Applicant's contribution: CONMICRO is National Research Project to create an Artificial Cognitive Control System for Micro-manufacturing Processes. His contributions were focused on the design and implementation of artificial cognitive system to carry out monitoring & control actions in micromachining process. During the project execution a group of machine learning and optimization algorithms were developed in mode and model-based architecture to provide self-learning and self-decision making skills obtaining the goal fixed by the client in manufacturing environments. Furthermore, this project was the principal contribution to the PhD dissertation presented in the 2017.

R&D non-competitive contracts, agreements or projects with public or private entities

1 **Name of the project:** Advanced machine learning solutions for pharmaceutical manufacturing industry

Identify key words: Artificial intelligence; Automatization on manufactured industry

Type of project: Industrial research

Geographical area: European Union

Degree of contribution: Scientific coordinator

Entity where project took place: Hitachi Europe Ltd. **Type of entity:** Business

City of entity: United Kingdom

Name principal investigator (PI, Co-PI....): Sergio Viera; Gerardo Beruvides; Anthony Ohazulike; Jonas Villumsen

Nº of researchers: 4

Participating entity/entities: Hitachi Europe Ltd.; Novo Nordisk Pharma

Funding entity or bodies:

Novo Nordisk

Type of entity: Business

City funding entity: Hillerod, Denmark

Start date: 17/06/2019

Duration: 1 year

Total amount: 160.000 €

2 **Name of the project:** Last Mile Maintenance and Repair solutions for smart-manufacturing environments

Identify key words: Artificial intelligence; Automatization on manufactured industry

Type of project: Industrial research

Geographical area: European Union



Degree of contribution: Coordinator of total project, network or consortium
Entity where project took place: Hitachi Europe Ltd. **Type of entity:** Business
City of entity: Munich, Germany
Name principal investigator (PI, Co-PI....): Gerardo Beruvides; Lan Lin
Nº of researchers: 2
Participating entity/entities: Flexthings; Hitachi Equipment and Components Group; Hitachi Europe Ltd.; Soft-In; epic InnoLabs
Funding entity or bodies:
Hitachi Europe Ltd. **Type of entity:** Business
City funding entity: London, United Kingdom
Start date: 01/04/2019 **Duration:** 8 months
Total amount: 268.000 €

3 **Name of the project:** Advanced machine learning solutions for quality control for semiconductor industry
Identify key words: Artificial intelligence; Complex domains analysis
Type of project: Industrial research **Geographical area:** Non EU International
Degree of contribution: Researcher
Entity where project took place: Hitachi Europe Ltd. **Type of entity:** Business
City of entity: London, United Kingdom
Name principal investigator (PI, Co-PI....): Anthony Ohazulike; Gerardo Beruvides
Nº of researchers: 2
Participating entity/entities: Hitachi Europe Ltd.; STMicro Electronics
Funding entity or bodies:
STMicro Electronics **Type of entity:** Business
City funding entity: Vietnam
Type of project: Cooperation
Start date: 01/11/2018 **Duration:** 6 months
Total amount: 80.000 €

4 **Name of the project:** Advanced machine learning solution for crusher machine classification and remaining useful life prediction into the mining industry
Identify key words: Computer assisted manufacturing; Automatization on manufactured industry
Type of project: Industrial research **Geographical area:** European Union
Degree of contribution: Researcher
Entity where project took place: Hitachi Europe GmbH **Type of entity:** Business
City of entity: Munich, Germany
Name principal investigator (PI, Co-PI....): Anthony Ohazulike; Gerardo Beruvides
Nº of researchers: 2
Participating entity/entities: Hitachi Europe GmbH; Sandvik Svedala
Funding entity or bodies:
Sandvik Svedala **Type of entity:** Business
City funding entity: Svedala, Sweden
Type of project: Cooperation
Start date: 03/09/2018 **Duration:** 4 months
Total amount: 30.000 €
Identify key words: Automatization on manufactured industry

5 **Name of the project:** Sistema inteligente de inspección y referenciado para operaciones de perfilado de paneles termoaislantes (SINTPER)
Type of project: Industrial research **Geographical area:** European Union
Degree of contribution: Researcher
Entity where project took place: Universidad politecnica de Madrid, Consejo Superior de Investigaciones Científicas (UPM-CSIC) **Type of entity:** Public Research Body
City of entity: Madrid, Community of Madrid, Spain
Name principal investigator (PI, Co-PI....): Rodolfo Haber Guerra
N° of researchers: 4
Participating entity/entities: , Consejo Superior de Investigaciones Científicas; Universidad Politécnica de Madrid
Funding entity or bodies: PANELWRAP **Type of entity:** Business
Type of project: Cooperation
Name of the programme: Contrato de Investigación
Start date: 01/06/2017 **Duration:** 1 year - 6 months
Total amount: 50.000 €
Relevant results: The contributions are focused on the design and implementation intelligence control architecture to highest tolerance compensation in Hot Wire cutting operations based on the Cyber-Physical System concept to merge the laser measurement sensor information with autonomous workpiece compensation without any external actions.
Identify key words: Fault tolerant control; Control by learning; Intelligent control; Calibration; Vision on real-time; Laser devices

6 **Name of the project:** AM.4G: Advanced Manufacturing 4th Generation
Type of project: Industrial research **Geographical area:** National
Degree of contribution: Researcher
Entity where project took place: Universidad Politécnica de Madrid **Type of entity:** University
City of entity: Madrid, Community of Madrid, Spain
Name principal investigator (PI, Co-PI....): Rodolfo Haber Guerra
N° of researchers: 5
Participating entity/entities: Consejo Superior de Investigaciones Científicas; Universidad Politécnica de Madrid
Funding entity or bodies: Fagor Automation Sociedad Cooperativa **Type of entity:** Business
City funding entity: Arrasate-Mondragón, Basque Country, Spain
Type of project: Cooperation
Name of the programme: Programa CIEN CDTI Convocatoria 2015
Start date: 01/01/2016 **Duration:** 2 years
Total amount: 75.000 €
Relevant results: The industry digitalization or Industry 4.0 concepts are a priority topic in the EU manufacturing sectors. His contributions in the AM.4G project are destined to the development of a cloud manufacturing system to provide predictive maintenance and post-selling services for the CNC Fagor customers. During the execution a local-cloud self-adaptation algorithm based on sensorial data captured in the floor shop is developed to estimate global machine indicators classified by CNC families, offering a personalized knowledge-based post-selling service.
Identify key words: Artificial intelligence; Machine tools; Cognitive behavior and learning; Real time systems; Estimators and predictors; Models based on the knowledge; Learning



- 7** **Name of the project:** R2A: Sistema Inteligente de Monitorización para Auscultación de Taladrados
Type of project: Industrial research **Geographical area:** National
Degree of contribution: Researcher
Entity where project took place: Universidad Politécnica de Madrid **Type of entity:** University
City of entity: Madrid, Community of Madrid, Spain
Name principal investigator (PI, Co-PI....): Rodolfo Haber Guerra
Nº of researchers: 5
Participating entity/entities: Consejo Superior de Investigaciones Científicas; Universidad Politécnica de Madrid
Funding entity or bodies: GEOCISA **Type of entity:** Business
City funding entity: Spain
Type of project: Cooperation
Name of the programme: Contrato de Investigación
Code according to the funding entity: PCD140070431
Start date: 01/01/2014 **Duration:** 1 year - 8 months
Total amount: 35.000 €
Relevant results: The contributions were destined to the design and prototyped of an autonomous robot equipped with vision system to estimate the pipeline quality based on image data for road and underground tunnels construction. The project was carried out in collaboration with the GEOCISA building company under the Spanish CIEN programme funding.
Identify key words: Robot design; Climbing robots; Sensorial fusion; Robots vision

Results

Industrial and intellectual property

Title registered industrial property: Procedimiento de parametrización automática de controlador mediante gemelo digital de un sistema ciberfísico
Inventors/authors/obtainers: Rodolfo Haber; Fernando Castano; Gerardo Beruvides; Alberto Villalonga
Entity holder of rights: Consejo Superior de Investigaciones Científicas
Nº of application: P201930465
Country of inscription: Spain, Community of Madrid
Date of register: 28/05/2019

Scientific and technological activities

Scientific production

Publications, scientific and technical documents

- 1** Ivan La Fe Perdomo; Gerardo Beruvides; Ramon Quiza; Rodolfo Haber; Marcelino Rivas. Automatic selection of optimal parameters based on simple soft computing methods. A case study on micro-milling processes. IEEE Transactions on Industrial Informatics. 99, IEEE, 2019. Available on-line at: <<http://ieeexplore.ieee.org/document/8325494/>>.

DOI: 10.1109/TII.2018.2816971

Type of production: Scientific paper

Position of signature: 2

Total no. authors: 5

Impact source: ISI

Impact index in year of publication: 5.430

Position of publication: 1

Relevant publication: Yes

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: No

Category: Science Edition - ENGINEERING, INDUSTRIAL

Journal in the top 25%: Yes

No. of journals in the cat.: 47

Citations: 6
- 2** Gerardo Beruvides; Alberto Villalonga; Pasquale Franciosa; Darek Ceglarek; Rodolfo Haber. Fault Pattern Identification in Multi-Stage Assembly Processes with non-ideal sheet-metal Parts based on Reinforcement Learning Architecture. Procedia CIRP. 67, pp. 601 - 606. Elsevier, 2018. Available on-line at: <<https://www.sciencedirect.com/science/article/pii/S2212827117312143>>. ISSN 2212-8271

DOI: 10.1016/j.procir.2017.12.268

Type of production: Scientific paper

Position of signature: 1

Total no. authors: 5

Relevant publication: Yes

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: Yes
- 3** Rodolfo Haber; Gerardo Beruvides; Ramon Quiza; Alejandro Hernandez. A Simple Multi-Objective Optimization Based on the Cross Entropy Method. IEEE ACCESS. 5, pp. 22272 - 22281. 2017.

DOI: 10.1109/ACCESS.2017.2764047

Type of production: Scientific paper

Position of signature: 2

Total no. authors: 4

Impact source: ISI

Impact index in year of publication: 3.557

Position of publication: 24

Relevant publication: Yes

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: No

Category: COMPUTER SCIENCE

Journal in the top 25%: Yes

No. of journals in the cat.: 148

Citations: 5

- 4** Fernando Castaño; Gerardo Beruvides; Rodolfo Haber; Antonio Artuñedo. Co-Simulation Framework for On-Chip Lidar Sensors in a Cyber-Physical System. *Sensors*. 17 - 9, pp. 2109 - 2119. MDPI, 2017.
DOI: 10.3390/s17092109
Type of production: Scientific paper
Position of signature: 2
Total no. authors: 4
Impact source: ISI
Impact index in year of publication: 2.475
Position of publication: 16
Relevant publication: Yes
Format: Journal
Degree of contribution: Author or co-author of article in journal with external admissions assessment committee
Corresponding author: No
Category: Science Edition - INSTRUMENTS & INSTRUMENTATION
Journal in the top 25%: Yes
No. of journals in the cat.: 61
Citations: 4
- 5** Gerardo Beruvides; Fernando Castaño; Rodolfo Haber; Ramon Quiza; Alberto Villalonga. Coping with complexity when predicting surface roughness in milling processes: Hybrid incremental model with optimal parametrization. *Complexity*. 2017, HINDAWI LTD, 2017.
DOI: 10.1155/2017/7317254
Type of production: Scientific paper
Position of signature: 1
Total no. authors: 5
Impact source: ISI
Impact index in year of publication: 1.829
Position of publication: 33
Source of citations: SCOPUS
Relevant publication: Yes
Format: Journal
Degree of contribution: Author or co-author of article in journal with external admissions assessment committee
Corresponding author: No
Category: MATHEMATICS, INTERDISCIPLINARY APPLICATIONS
Journal in the top 25%: No
No. of journals in the cat.: 103
Citations: 3
- 6** Fernando Castaño; Gerardo Beruvides; Alberto Villalonga; Rodolfo Haber. Time-to-Failure Modelling in On-Chip LiDAR Sensors for Automotive Applications. *Proceedings*. 1 - 8, pp. 809. Basel(Switzerland): MDPI, 2017.
DOI: 10.3390/proceedings1080809
Type of production: Scientific paper
Position of signature: 2
Total no. authors: 4
Relevant publication: Yes
Format: Journal
Degree of contribution: Author or co-author of article in journal with external admissions assessment committee
Corresponding author: No
- 7** Gerardo Beruvides; Ramon Quiza; Rodolfo Haber. Multi-Objective Optimization Based on an Improved Cross-Entropy Method. A Case Study of a Micro-Scale Manufacturing Process. *INFORMATION SCIENCES*. 334-335, pp. 161 - 173. Springer, 2016.
DOI: 10.1016/j.ins.2015.11.040
Type of production: Scientific paper
Position of signature: 1
Total no. authors: 3
Impact source: ISI
Impact index in year of publication: 4.832
Position of publication: 7
Format: Journal
Degree of contribution: Author or co-author of article in journal with external admissions assessment committee
Corresponding author: Yes
Category: COMPUTER SCIENCE
Journal in the top 25%: Yes
No. of journals in the cat.: 146



Source of citations: SCOPUS

Citations: 9

Relevant publication: Yes

- 8** Gerardo Beruvides; Fernando Castaño; Ramon Quiza; Rodolfo Haber. Surface Roughness Modeling and Optimization of Tungsten-Copper Alloys in Micro-Milling Processes. MEASUREMENT. 86, pp. 246 - 252. Elsevier, 2016.

DOI: 10.1016/j.measurement.2016.03.002

Type of production: Scientific paper

Position of signature: 1

Total no. authors: 4

Impact source: ISI

Impact index in year of publication: 2.359

Position of publication: 19

Source of citations: SCOPUS

Relevant publication: Yes

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: Yes

Category: ENGINEERING, MULTIDISCIPLINARY

Journal in the top 25%: Yes

No. of journals in the cat.: 85

Citations: 5

- 9** Rodolfo Haber; Carmelo Juanes; Raul del Toro; Gerardo Beruvides. Artificial Cognitive Control with Self-X Capabilities: A Case Study of a Micro-Manufacturing Process. COMPUTERS IN INDUSTRY. 74, pp. 135 - 150. 2015.

DOI: 10.1016/j.compind.2015.05.001

Type of production: Scientific paper

Position of signature: 4

Total no. authors: 4

Impact source: ISI

Impact index in year of publication: 1.685

Position of publication: 44

Source of citations: SCOPUS

Relevant publication: Yes

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: No

Category: COMPUTER SCIENCE

Journal in the top 25%: No

No. of journals in the cat.: 104

Citations: 6

- 10** Fernando Castaño; Raul del Toro; Rodolfo Haber; Gerardo Beruvides. Conductance Sensing for Monitoring Micromechanical Machining of Conductive Materials. SENSORS AND ACTUATORS A: PHYSICAL. 232, pp. 163 - 171. Elsevier, 2015.

DOI: 10.1016/j.sna.2015.05.015

Type of production: Scientific paper

Position of signature: 4

Total no. authors: 4

Impact source: ISI

Impact index in year of publication: 2.201

Position of publication: 10

Source of citations: SCOPUS

Relevant publication: Yes

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: No

Category: INSTRUMENTS & INSTRUMENTATION

Journal in the top 25%: Yes

No. of journals in the cat.: 56

Citations: 3

- 11** Gerardo Beruvides; Ramon Quiza; Raul del Toro; Fernando Castaño; Rodolfo Haber. Correlation of the Holes Quality with the Force Signals in a Microdrilling Process of a Sintered Tungsten-Copper Alloy. INTERNATIONAL JOURNAL OF PRECISION ENGINEERING AND MANUFACTURING. 15, pp. 1801 - 1808. Springer, 2014.

DOI: 10.1007/s12541-014-0532-5

Type of production: Scientific paper

Position of signature: 1

Total no. authors: 5

Impact source: ISI

Impact index in year of publication: 1.205

Position of publication: 51

Source of citations: SCOPUS

Relevant publication: Yes

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: Yes

Category: ENGINEERING, MECHANICAL

Journal in the top 25%: No

No. of journals in the cat.: 130

Citations: 3

- 12** Gerardo Beruvides; Ramón Quiza; Marcelino Rivas; Fernando Castaño; Rodolfo E. Haber. Online Detection of Run Out in Microdrilling of Tungsten and Titanium Alloys. International Journal of Precision Engineering and Manufacturing. Springer, 2014.

DOI: 10.1007/s00170-014-6091-1

Type of production: Scientific paper

Position of signature: 1

Total no. authors: 5

Impact source: ISI

Impact index in year of publication: 1.458

Position of publication: 17

Source of citations: SCOPUS

Relevant publication: Yes

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: Yes

Category: ENGINEERING, MANUFACTURING

Journal in the top 25%: No

No. of journals in the cat.: 40

Citations: 1

- 13** Gerardo Beruvides; Ramón Quiza; Raúl M. del Toro; Rodolfo E. Haber. Sensing System and Signals Analysis for Tool use Monitoring in Microdrilling of a Sintered Tungsten-Copper Composite Material. Sensors and Actuators A: Physical. 199, pp. 165 - 175. Elsevier, 2013.

DOI: 10.1016/j.sna.2013.05.021

Type of production: Scientific paper

Position of signature: 1

Total no. authors: 4

Impact source: ISI

Impact index in year of publication: 1.943

Position of publication: 12

Source of citations: SCOPUS

Relevant publication: Yes

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: Yes

Category: SENSORS AND ACTUATORS A: PHYSICAL

Journal in the top 25%: Yes

No. of journals in the cat.: 57

Citations: 18

- 14** Alberto Villalonga; Gerardo Beruvides; Fernando Castano; Rodolfo Haber. Cloud-based Industrial Cyber-Physical System for Data-driven Reasoning. A Review and Use Case on an Industry 4.0 Pilot Line. IEEE Transactions on Industrial Informatics. IEEE, 2020.

Type of production: Scientific paper

Position of signature: 2

Total no. authors: 4

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: No



- 15** Fernando Castaño; Gerardo Beruvides; Alberto Villalonga; Rodolfo Haber. Self-Tuning Method for Increasing Reliability in Obstacle Detection based on Internet-of-Things LiDar Sensor Models. *Sensors*. 18 - 5, pp. 1508. MDPI, 2018.
DOI: <https://doi.org/10.3390/s18051508>
Type of production: Scientific paper
Corresponding author: No
Impact source: ISI
Impact index in year of publication: 2.475
Position of publication: 16
Source of citations: SCOPUS
- Format:** Journal
Category: Science Edition - INSTRUMENTS & INSTRUMENTATION
No. of journals in the cat.: 61
Citations: 3
- 16** Gerardo Beruvides; Ramón Quiza; Rodolfo E. Haber; Raúl M. del Toro. Features Extraction from Signals for Indirect Tool Condition Monitoring in Microdrilling. *Revista Dyna*. 88 - 4, pp. 405 - 413. 2013.
DOI: 10.6036/DYNAIL
Type of production: Scientific paper
Position of signature: 1
Total no. authors: 4
Impact source: ISI
Impact index in year of publication: 0.200
Position of publication: 82
Source of citations: SCOPUS
Relevant publication: No
- Format:** Journal
Degree of contribution: Author or co-author of article in journal with external admissions assessment committee
Corresponding author: No
Category: ENGINEERING, MULTIDISCIPLINARY
Journal in the top 25%: No
No. of journals in the cat.: 87
Citations: 1
- 17** Ramón Quiza; Gerardo Beruvides; Joao P. Davim. Modeling and optimization of mechanical systems and processes. *Modern mechanical engineering*. pp. 169 - 198. Springer, 2014. ISBN 978-3-642-45175-1
Type of production: Book chapter
Position of signature: 2
Total no. authors: 3
Relevant publication: Yes
- Format:** Book
Degree of contribution: Author or co-author of chapter in book
Corresponding author: No
- 18** Ramon Quiza; Gerardo Beruvides; Marcelino Rivas; J. Paulo Davim. *Cloud-based Optimization in Manufacturing Digital Industries*. Springer Books. Springer, 2020.
Type of production: Book chapter
Position of signature: 2
Total no. authors: 4
- Format:** Book
Degree of contribution: Author or co-author of chapter in book
Corresponding author: No
- 19** Gerardo Beruvides. *Artificial Cognitive Architecture with Self-Learning and Self-Optimization Capabilities. Case Studies in Micromachining Processes*. Springer Thesis. pp. 1 - 260. Springer Nature Switzerland, 2019. ISSN 2190-5053, ISBN 978-3-030-03948-6
DOI: <https://doi.org/10.1007/978-3-030-03949-3>
Type of production: Scientific book or monograph
Position of signature: 1
Total no. authors: 1
Relevant results: This book introduces three key issues: (i) development of a gradient-free method to enable multi-objective self-optimization; (ii) development of a reinforcement learning strategy to carry out self-learning
- Format:** Book
Degree of contribution: Author or co-author of entire book
Corresponding author: Yes



and finally, (iii) experimental evaluation and validation in two micromachining processes (i.e., micro-milling and micro-drilling). The computational architecture (modular, network and reconfigurable for real-time monitoring and control) takes into account the analysis of different types of sensors, processing strategies and methodologies for extracting behavior patterns from representative process' signals.

Relevant publication: Yes

Works submitted to national or international conferences

- 1 Title of the work:** Visual Analytics Framework for Condition Monitoring in Cyber-Physical Systems
Name of the conference: 23rd IEEE International Conference on System Theory, Control and Computing (ICSTCC)
Type of event: Conference
Corresponding author: No
City of event: Sinaia, Romania
Date of event: 09/10/2019
End date: 11/10/2019
Organising entity: IEEE **Type of entity:** Foundation
Type of contribution: Scientific paper
Alberto Villalonga; Fernando Castaño; Gerardo Beruvides; Rodolfo Haber; Stanisław Strzelczak; Joanna Kossakowska. IEEE, Available on-line at: <<https://ieeexplore.ieee.org/document/8885611>>. ISSN 2372-1618
DOI: 10.1109/ICSTCC.2019.8885611
- 2 Title of the work:** Towards the Adoption of Cyber-Physical Systems of Systems Paradigm in Smart Manufacturing Environments
Name of the conference: IEEE International Conference of Industrial Informatics – INDIN18
Corresponding author: No
City of event: Porto, Portugal
Date of event: 18/07/2018
Organising entity: Institute of Electrical and Electronics Engineers (IEEE)
Borja Ramis; Wael Mohammed; José Luis Martínez-Lastra; Alberto Villalonga; Gerardo Beruvides; Fernando Castaño; Rodolfo Haber. "Towards the Adoption of Cyber-Physical Systems of Systems Paradigm in Smart Manufacturing Environments".
DOI: <https://doi.org/10.1109/INDIN.2018.8472061>
- 3 Title of the work:** Condition-based Monitoring Architecture for CNC Machine Tools based on Global Knowledge
Name of the conference: Information Control Problems in Manufacturing (INCOM 2018)
Corresponding author: Yes
City of event: Bergamo, Lombardia, Italy
Date of event: 11/06/2018
End date: 13/06/2018
Organising entity: International Federation of Automatic Control (IFAC) **Type of entity:** Associations and Groups
Alberto Villalonga; Gerardo Beruvides; Fernando Castaño; Rodolfo Haber; Marcelino Novo. "Condition-based Monitoring Architecture for CNC Machine Tools based on Global Knowledge".
- 4 Title of the work:** Industrial Cyber-Physical System for Condition-based Monitoring in Manufacturing Processes
Name of the conference: 1er IEEE International Conference on Industrial Cyber-Physical Systems (ICPS)
Corresponding author: Yes
City of event: San Peterburg, Russia



Date of event: 15/05/2018

End date: 18/05/2018

Organising entity: Institute of Electrical and Electronics Engineers (IEEE)

Type of entity: Associations and Groups

Alberto Villalonga; Gerardo Beruvides; Fernando Castaño; Rodolfo Haber. "Industrial Cyber-Physical System for Condition-based Monitoring in Manufacturing Processes".

5 Title of the work: Digitalización de la industria un cambio o una revolución

Name of the conference: Expo Manufactura 4.0 – Máxima Productividad y Competitividad

Corresponding author: Yes

City of event: Monterrey, Mexico

Date of event: 05/02/2018

"Digitalización de la industria un cambio o una revolución".

6 Title of the work: Arquitectura para la Gestión de Eventos y Alarmas en Máquinas CNC desde el enfoque de los Sistema Ciberfísicos

Name of the conference: XXI Congreso de Fabricación Avanzada y Máquinas-herramienta

Type of event: Conference

Type of participation: Participatory - poster

Corresponding author: Yes

City of event: San Sebastián, Basque Country, Spain

Date of event: 25/10/2017

End date: 27/10/2017

Organising entity: Advanced Manufacturing Technologies (AFM)

Type of entity: Associations and Groups

City organizing entity: San Sebastián, Basque Country, Spain

Gerardo Beruvides; Rodolfo Haber; Fernando Castaño; Marcelino Novo; Carlos Yurre.

7 Title of the work: Time-to-Failure Modelling in On-Chip LiDAR Sensors for Automotive Applications

Name of the conference: International Symposium on Sensor Science (I3S2017)

Type of event: Conference

Geographical area: European Union

Type of participation: Participatory - oral communication

Reasons for participation: Review before acceptance

Corresponding author: No

City of event: Barcelona, Catalonia, Spain

Date of event: 27/09/2017

End date: 29/09/2017

Organising entity: MDPI SCIFORUM

City organizing entity: Basel, Switzerland

Publication in conference proceedings: Yes

With external admission assessment committee: Yes

Type of contribution: Scientific paper

Fernando Castaño; Gerardo Beruvides; Alberto Villalonga; Rodolfo Haber. "Time-to-Failure Modelling in On-Chip LiDAR Sensors for Automotive Applications". En: MDPI proceedings. MDPI AG, 29/11/2017.

8 Title of the work: Fault Pattern Identification in Multi-Stage Assembly Processes with non-ideal sheet-metal Parts based on Reinforcement Learning Architecture

Name of the conference: CIRP Conference on Intelligent Computation in Manufacturing Engineering (ICME)

Type of event: Conference

Geographical area: Non EU International

Type of participation: Participatory - oral communication

Reasons for participation: Review before acceptance



Corresponding author: Yes

City of event: Napoli, Campania, Italy

Date of event: 19/07/2017

End date: 21/07/2017

Organising entity: Cooperative Institutional Research Program (CIRP)

Type of entity: Associations and Groups

With external admission assessment committee: Yes

Type of contribution: Scientific paper

Gerardo Beruvides; Alberto Villalonga; Pasquale Franciosa; Darek Ceglarek; Rodolfo Haber. "Fault Pattern Identification in Multi-Stage Assembly Processes with non-ideal sheet-metal Parts based on Reinforcement Learning Architecture". En: CIRP conference proceedings.

9 Title of the work: Monitoring tool usage on the basis of sensory information in microdrilling operations

Name of the conference: IEEE International Conference on Industrial Technology (ICIT)

Type of event: Conference

Geographical area: Non EU International

Type of participation: Participatory - oral communication

Reasons for participation: Review before acceptance

Corresponding author: Yes

City of event: Taipei, Taiwan

Date of event: 14/03/2016

End date: 17/03/2016

Organising entity: Institute of Electrical and Electronics Engineers (IEEE)

Type of entity: Associations and Groups

Publication in conference proceedings: Yes

With external admission assessment committee: Yes

Type of contribution: Scientific paper

Fernando Castaño; Raul Del Toro; Rodolfo Haber; Gerardo Beruvides. "Monitoring tool usage on the basis of sensory information in microdrilling operations". En: IEEE conference proceedings. pp. 667 - 672. IEEE, 26/05/2016. Available on-line at: <<http://ieeexplore.ieee.org/document/7474829/>>.

10 Title of the work: A self-learning strategy for artificial cognitive control systems

Name of the conference: IEEE International Conference on Industrial Informatics (INDIN)

Type of event: Conference

Geographical area: European Union

Type of participation: Participatory - oral communication

Reasons for participation: Review before acceptance

Corresponding author: Yes

City of event: Cambridge, United Kingdom

Date of event: 22/06/2015

End date: 24/06/2015

Organising entity: Institute of Electrical and Electronics Engineers (IEEE)

Type of entity: Associations and Groups

Publication in conference proceedings: Yes

With external admission assessment committee: Yes

Type of contribution: Scientific paper

Gerardo Beruvides; Carmelo Juanes; Fernando Castaño; Rodolfo Haber. "A self-learning strategy for artificial cognitive control systems". En: IEEE conference proceedings. pp. 1180 - 1185. IEEE, 01/10/2015. Available on-line at: <<http://ieeexplore.ieee.org/document/7281903/>>.

DOI: 10.1109/INDIN.2015.7281903

11 Title of the work: On-line Artificial Cognitive Control for Micromanufacturing Processes

Name of the conference: Congreso máquinas-herramienta y tecnologías de fabricación

Type of event: Conference



Type of participation: 'Participatory - poster

Corresponding author: Yes

City of event: San Sebastián, Basque Country, Spain

Date of event: 10/06/2015

End date: 12/06/2015

Organising entity: Advanced Manufacturing Technologies (AFM)

Type of entity: Associations and Groups

City organizing entity: San Sebastián, Basque Country, Spain

Gerardo Beruvides; Rodolfo Haber; Raul del Toro; Fernando Castaño.

12 Title of the work: Conductance Sensor for Micromachining. A Case Study on Monitoring Tool-Workpiece Contact

Name of the conference: IEEE International Conference of Industrial Technology (ICIT)

Type of event: Conference

Geographical area: European Union

Type of participation: Participatory - oral communication

Reasons for participation: Review before acceptance

Corresponding author: No

City of event: Sevilla, Andalusia, Spain

Date of event: 17/03/2015

End date: 19/03/2015

Organising entity: Institute of Electrical and Electronics Engineers (IEEE)

Type of entity: Associations and Groups

Publication in conference proceedings: Yes

With external admission assessment committee: Yes

Type of contribution: Scientific paper

Fernando Castaño; Rodolfo Haber; Raul Del Toro; Gerardo Beruvides. "Conductance Sensor for Micromachining. A Case Study on Monitoring Tool-Workpiece Contact". En: IEEE conference proceedings. pp. 1422 - 1426. IEEE, 18/06/2015. Available on-line at: <<http://ieeexplore.ieee.org/document/7125296/>>. ISBN 978-1-4799-7800-7

DOI: 10.1109/ICIT.2015.7125296

13 Title of the work: Application of hybrid incremental modeling strategy for surface roughness estimation in micromachining processes

Name of the conference: IEEE Symposium Series on Computational Intelligence (SSCI)

Type of event: Conference

Geographical area: Non EU International

Type of participation: Participatory - oral communication

Reasons for participation: Review before acceptance

Corresponding author: No

City of event: Orlando, United States of America

Date of event: 09/12/2014

End date: 12/12/2014

Organising entity: Institute of Electrical and Electronics Engineers (IEEE)

Type of entity: Associations and Groups

Publication in conference proceedings: Yes

With external admission assessment committee: Yes

Type of contribution: Scientific paper

Fernando Castaño; Rodolfo Haber; Raul Del Toro; Gerardo Beruvides. "Application of hybrid incremental modeling strategy for surface roughness estimation in micromachining processes". En: IEEE conference proceedings. pp. 54 - 59. IEEE, 19/01/2015. Available on-line at: <<http://ieeexplore.ieee.org/document/7011831/>>.

DOI: 10.1109/CIES.2014.7011831



- 14** **Title of the work:** Artificial intelligence-based modelling and optimization of microdrilling processes
Name of the conference: IEEE Symposium Series on Computational Intelligence (SSCI)
Type of event: Conference
Type of participation: Participatory - oral communication
Geographical area: Non EU International
Reasons for participation: Review before acceptance
Corresponding author: Yes
City of event: Orlando, United States of America
Date of event: 09/12/2014
End date: 12/12/2014
Organising entity: Institute of Electrical and Electronics Engineers (IEEE)
Type of entity: Associations and Groups
Publication in conference proceedings: Yes
With external admission assessment committee: Yes
Type of contribution: Scientific paper
Gerardo Beruvides; Ramon Quiza; Marcelino Rivas; Fernando Castaño; Rodolfo Haber. "Artificial intelligence-based modelling and optimization of microdrilling processes". En: IEEE conference proceedings. pp. 49 - 53. IEEE, 19/01/2015. Available on-line at: <<http://ieeexplore.ieee.org/document/7011830/>>.
DOI: 10.1109/CIES.2014.7011830
- 15** **Title of the work:** Intelligent Models for Predicting the Force and Perpendicular Vibrations in Microdrilling Processes
Name of the conference: IEEE International Conference on Tools with Artificial Intelligence (ICTAI)
Type of event: Conference
Type of participation: Participatory - oral communication
Geographical area: European Union
Reasons for participation: Review before acceptance
Corresponding author: Yes
City of event: Limassol, Kypros / Kibris, Cyprus
Date of event: 10/11/2014
End date: 12/11/2014
Organising entity: Institute of Electrical and Electronics Engineers (IEEE)
Type of entity: Associations and Groups
Publication in conference proceedings: Yes
With external admission assessment committee: Yes
Type of contribution: Scientific paper
Gerardo Beruvides; Ramon Quiza; Marcelino Rivas; Fernando Castaño; Rodolfo Haber. "Intelligent Models for Predicting the Force and Perpendicular Vibrations in Microdrilling Processes". En: IEEE conference proceedings. pp. 506 - 511. IEEE, 15/12/2014. Available on-line at: <<http://ieeexplore.ieee.org/document/6984518/>>. ISBN 978-1-4799-6572-4
DOI: 10.1109/ICTAI.2014.82
- 16** **Title of the work:** A Fuzzy-Genetic System to Predict the Cutting Force in Microdrilling Processes
Name of the conference: IEEE Industrial Electronics Conference
Type of event: Conference
Type of participation: Participatory - oral communication
Geographical area: Non EU International
Reasons for participation: Review before acceptance
Corresponding author: Yes
City of event: Dallas, Texas, United States of America
Date of event: 29/10/2014
End date: 01/11/2014
Organising entity: Institute of Electrical and Electronics Engineers (IEEE)
Type of entity: Associations and Groups
With external admission assessment committee: Yes

**Type of contribution:** Scientific paper

Gerardo Beruvides; Ramon Quiza; Fernando Castaño; Rodolfo Haber. "A Fuzzy-Genetic System to Predict the Cutting Force in Microdrilling Processes". En: IEEE conference proceedings. pp. 34 - 37. IEEE, Available on-line at: <<http://ieeexplore.ieee.org/document/7048473/>>. ISSN 1553-572X, ISBN 978-1-4799-4032-5

DOI: 10.1109/IECON.2014.7048473

Works submitted to national or international seminars, workshops and/or courses

- 1** **Title of the work:** Monitorización del Estado de Rodamientos basada en Técnicas de Aprendizaje Automático
Name of the event: XL Jornadas de Automática
Corresponding author: No
City of event: Castellon, Spain
Date of event: 04/09/2019
End date: 06/09/2019
Organising entity: COMITE ESPAÑOL DE AUTOMATICA DE LA IFAC
Alberto Villalonga; Fernando Castaño; Fernando Matias; Gerardo Beruvides; Rodolfo Haber.

- 2** **Title of the work:** Sistema de monitoreo de bajo costo para procesos mecánicos
Name of the event: VIII Conferencia Científica Internacional de la Universidad de Holguín
Type of event: Workshop
Corresponding author: No
City of event: Holguín, Cuba
Date of event: 26/04/2017
End date: 28/04/2017
Organising entity: Universidad de Holguín **Type of entity:** University
City organizing entity: Holguín, Cuba
With external admission assessment committee: Yes
Type: Scientific paper
Alberto Villalonga; Ramon Quiza; Gerardo Beruvides. "Sistema de monitoreo de bajo costo para procesos mecánicos".

- 3** **Title of the work:** Modelación Empírica de la Fuerza de Corte en el Proceso de Microfresado de Ti6Al4V
Name of the event: II Simposio Internacional de Modelación Aplicada a la Ingeniería (MAI)
Type of event: Workshop
Corresponding author: No **Reasons for participation:** Speaker
Geographical area: Non EU International
City of event: La Habana, Cuba
Date of event: 21/11/2016
End date: 25/11/2016
Organising entity: Universidad Tecnológica de La Habana José Antonio Echeverría (CUJAE) **Type of entity:** University
City organizing entity: La Habana, Cuba
With external admission assessment committee: Yes
Type: Scientific paper
Ivan La Fe; Ramon Quiza; Gerardo Beruvides; Rodolfo Haber. "Modelación Empírica de la Fuerza de Corte en el Proceso de Microfresado de Ti6Al4V". ISBN 978-959-261-533-5



- 4** **Title of the work:** Inteligencia Computacional Embebida Para La Supervisión De Procesos De Microfabricación
Name of the event: XXXVII Jornadas de Automática
Type of event: Workshop
Corresponding author: No **Reasons for participation:** Speaker
Geographical area: European Union
City of event: Madrid, Community of Madrid, Spain
Date of event: 07/09/2016
End date: 09/09/2016
Organising entity: Comité Español de Automática (CEA)
City organizing entity: Spain
With external admission assessment committee: Yes
Type: Scientific paper
Fernando Castaño; Rodolfo Haber; Gerardo Beruvides. "Inteligencia Computacional Embebida Para La Supervisión De Procesos De Microfabricación". Available on-line at: <<http://ja2016.uned.es/>>.
- 5** **Title of the work:** Sistema inteligente de monitorización para la auscultación de tuberías mediante robot
Name of the event: XII Simposio CEA de Control Inteligente
Type of event: Workshop
Corresponding author: No **Reasons for participation:** Speaker
Geographical area: European Union
City of event: Gijón, Principality of Asturias, Spain
Date of event: 22/06/2016
End date: 24/06/2016
Organising entity: Comité Español de Automática (CEA) **Type of entity:** Associations and Groups
City organizing entity: Spain
Publication in conference proceedings: Yes **With external admission assessment committee:** Yes
Fernando Castaño; Gerardo Beruvides; Rodolfo Haber; Juan Muñoz. En: Actas del Simposio. Available on-line at: <<http://isa.uniovi.es/sci2016/>>. ISBN 978-84-16664-18-4
- 6** **Title of the work:** Surface Quality Prediction using Hybrid Incremental Modeling
Name of the event: XII Simposio CEA de Control Inteligente
Type of event: Workshop
Corresponding author: Yes **Reasons for participation:** Speaker
Geographical area: European Union
City of event: Gijón, Principality of Asturias, Spain
Date of event: 22/06/2016
End date: 24/06/2016
Organising entity: Comité Español de Automática (CEA) **Type of entity:** Associations and Groups
City organizing entity: Spain
Publication in conference proceedings: Yes **With external admission assessment committee:** Yes
Type: Scientific paper
Gerardo Beruvides; Fernando Castaño; Rodolfo Haber. "Surface Quality Prediction using Hybrid Incremental Modeling". En: Memoria evento. Available on-line at: <<http://isa.uniovi.es/sci2016/>>. ISBN 978-84-16664-18-4



- 7** **Title of the work:** Arquitectura de Control Cognitivo Artificial usando una plataforma computacional de bajo costo
Name of the event: XI Simposio CEA de Control Inteligente
Type of event: Workshop
Corresponding author: Yes **Reasons for participation:** Speaker
Geographical area: European Union
City of event: Badajoz, Extremadura, Spain
Date of event: 24/06/2015
End date: 26/06/2015
Organising entity: Comité Español de Automática (CEA) **Type of entity:** Associations and Groups
City organizing entity: Spain
Publication in conference proceedings: Yes **With external admission assessment committee:** Yes
Type: Scientific paper
Gerardo Beruvides; Carmelo Juanes; Rodolfo Haber; Fernando Castaño. "Arquitectura de Control Cognitivo Artificial usando una plataforma computacional de bajo costo". En: Memoria evento. Available on-line at: <<http://www.eweb.unex.es/eweb/sci2015/>>. ISBN 978-84-606-9052-8

- 8** **Title of the work:** Efectividad del diseño ortogonal y los algoritmos genéticos en la optimización multi-objetivo del proceso de torneado
Name of the event: Convención Científica Internacional de la Universidad de Matanzas (CIUM)
Type of event: Workshop
Corresponding author: No **Reasons for participation:** Speaker
Geographical area: Non EU International
City of event: Matanzas, Cuba
Date of event: 06/04/2015
End date: 10/04/2015
Organising entity: Universidad de Matanzas **Type of entity:** University
City organizing entity: Matanzas, Cuba
Publication in conference proceedings: Yes **With external admission assessment committee:** Yes
Type: Scientific paper
Cecilio Cannavacciuolo; Marcelino Rivas; Ramon Quiza; Rodolfo Haber; Gerardo Beruvvides. "Efectividad del diseño ortogonal y los algoritmos genéticos en la optimización multi-objetivo del proceso de torneado". En: CIUM memorias 2015. ISBN 978-959-16-2442-0

- 9** **Title of the work:** Modelo Neuronal de la Fuerza de Corte en el Microtaladrado de Aleaciones Especiales
Name of the event: X Simposio CEA de Control Inteligente
Type of event: Workshop
Corresponding author: Yes **Reasons for participation:** Speaker
Geographical area: European Union
City of event: Segovia, Castile and León, Spain
Date of event: 25/03/2014
End date: 27/03/2014
Organising entity: Comité Español de Automática (CEA) **Type of entity:** Associations and Groups
City organizing entity: Spain
Publication in conference proceedings: Yes **With external admission assessment committee:** Yes
Type: Scientific paper



Gerardo Beruvides; Ramon Quiza; Marcelino Rivas; Fernando Castaño; Rodolfo Haber. "Modelo Neuronal de la Fuerza de Corte en el Microtallado de Aleaciones Especiales". En: Memoria evento. Available on-line at: <<http://simposio.uned.es/index.html>>.

- 10 Title of the work:** Monitorización inteligente en tiempo real del acabado superficial de micro-piezas basado en modelado híbrido incremental

Name of the event: X Simposio CEA de Control Inteligente

Type of event: Workshop

Corresponding author: No

Reasons for participation: Speaker

Geographical area: European Union

City of event: Segovia, Castile and León, Spain

Date of event: 25/03/2014

End date: 27/03/2014

Organising entity: Comité Español de Automática (CEA)

Type of entity: Associations and Groups

City organizing entity: Spain

Publication in conference proceedings: Yes

With external admission assessment committee: Yes

Type: Scientific paper

Fernando Castaño; Rodolfo Haber; Raul Del Toro; Gerardo Beruvides. "Monitorización inteligente en tiempo real del acabado superficial de micro-piezas basado en modelado híbrido incremental". En: Memoria evento. Available on-line at: <<http://simposio.uned.es/index.html>>.

- 11 Title of the work:** Sistema de Monitoreo del Estado de la Herramienta de Corte

Name of the event: Convención Científica Internacional de la Universidad de Matanzas (CIUM)

Type of event: Workshop

Corresponding author: Yes

Reasons for participation: Speaker

Geographical area: Non EU International

City of event: Matanzas, Cuba

Date of event: 26/03/2013

End date: 28/03/2013

Organising entity: Universidad de Matanzas

Type of entity: University

City organizing entity: Matanzas, Cuba

Publication in conference proceedings: Yes

With external admission assessment committee: Yes

Type: Scientific paper

Gerardo Beruvides; Ramon Quiza. "Sistema de Monitoreo del Estado de la Herramienta de Corte". En: CIUM memorias 2013. Available on-line at: <http://cict.umcc.cu/repositorio/directorio_eventos/cium%202013/>. ISBN 978-959-16-2100-9

- 12 Title of the work:** Biblioteca de Funciones en MATLAB para el Filtrado de Señales en Procesos de Microtallado

Name of the event: Convención Científica Internacional de la Universidad de Matanzas (CIUM)

Type of event: Workshop

Corresponding author: Yes

Reasons for participation: Speaker

Geographical area: Non EU International

City of event: Matanzas, Cuba

Date of event: 07/11/2011

End date: 11/11/2011

Organising entity: Universidad de Matanzas

Type of entity: University

City organizing entity: Matanzas, Cuba

Publication in conference proceedings: Yes



With external admission assessment committee:
Yes

Type: Scientific paper

Gerardo Beruvvides; Ramon Quiza. "Biblioteca de Funciones en MATLAB para el Filtrado de Señales en Procesos de Microtallado". En: CIUM memorias. Available on-line at: <http://cict.umcc.cu/repositorio/directorio_eventos/cium%202011/>. ISBN 978-959-16-1399-8

R&D management and participation in scientific committees

Organization of R&D activities

Title of the activity: Special Sessions on Innovative Computational Intelligence Knowledge-based Solutions for Zero Defect Scenarios on Industrial Cyber-Physical Systems

Type of activity: IEEE International Conference on Industrial Cyber-Physical Systems (ICPS-2018) **Geographical area:** Non EU International

City of event: San Petersburgo, Russia

Convening entity: Institute of Electrical and Electronics Engineers (IEEE)

City convening entity: San Petersburgo, Russia

Type of participation: Organiser

N° assistants: 10

Start-End date: 15/05/2018 - 18/05/2018

Duration: 4 days

Other achievements

Stays in public or private R&D centres

- 1 Entity:** Tampere University of Technology (TUT) **Type of entity:** University
Faculty, institute or centre: Fast Lab
City of entity: Tampere, Finland
Start-End date: 11/03/2018 - 31/03/2018 **Duration:** 21 days
Goals of the stay: Post-doctoral
- 2 Entity:** Sistemas Automotrices de Mexico (SISAMEX) **Type of entity:** Innovation and Technology Centres
Faculty, institute or centre: Centro de Desarrollo Tecnológico y Humano (CDTH)
City of entity: Monterrey, Mexico
Start-End date: 05/02/2018 - 16/02/2018 **Duration:** 14 days
Goals of the stay: Post-doctoral
- 3 Entity:** Yokohama Research Laboratory **Type of entity:** Business
Faculty, institute or centre: Hitachi Ltd.
City of entity: Yokohama, Japan
Start-End date: 05/06/2017 - 01/09/2017 **Duration:** 2 months - 29 days
Funding entity: Ministerio de Economía, Industria y Competitividad **Type of entity:** State agency
City funding entity: Madrid, Community of Madrid, Spain
Name of programme: Ayudas a la movilidad predoctoral para la realización de estancias breves en centros de I+D (FPI)
Goals of the stay: Doctorate



Acquired skills developed: Desarrollo de algoritmos, arquitecturas y propuestas para entornos de Industria 4.0, Networking con líderes del sector industrial

Relevant results: During the research stay, the activities were focused on the management and optimization production indexes and worker's productivity per machine tools, plant and company levels in function to increase manufacturing components for the energy industry, automotive and rail, among others. Furthermore, he has worked on the development of strategies for the optimization of the productive flow based on a 4M model (Man, Material, Machine, Method), being part of the staff to develop a use case based on Crowdsourced Manufacturing Cloud as a Service. In particular, a tool was designed and implemented to generate planning in real-time manufacturing systems based on global information gathered from a network of integrated cyber-physical sensors in the different machine-tools, robots and measuring stations of the company in its factories worldwide. Hitachi in collaboration with other global companies is immersed in the realization of collaborative environments based on Industrial Internet of Thing or Industry 4.0 concepts. Finally, he has attended to a series of conferences and technical seminars where the vision of the Japanese manufacturers was debated, considering that it is not only industrial revolution, it is also a social transformation, also call as Society 5.0.

- 4** **Entity:** Warwick Manufacturing Group **Type of entity:** University
Faculty, institute or centre: University of Warwick
City of entity: Coventry, West Midlands, United Kingdom
Start-End date: 28/08/2016 - 23/12/2016 **Duration:** 3 months - 28 days
Funding entity: Ministerio de Economía, Industria y Competitividad **Type of entity:** State agency
City funding entity: Madrid, Community of Madrid, Spain
Name of programme: Ayudas a la movilidad predoctoral para la realización de estancias breves en centros de I+D (FPI)
Goals of the stay: Doctorate
Acquired skills developed: Desarrollo de arquitecturas inteligentes para la toma de decisiones adaptativa en robots para procesos de ensamblaje de coches
Relevant results: During research stay were carried out activities aimed at programming trajectories of robotic arms designed for online measurement systems for the automotive parts manufacturing industry. Specifically, in the measurement of the different elements that make up the assembly of the doors to the body, as well as in the processing of images through an artificial vision system developed by the Hexagon company. In addition, a library of functions was developed in Matlab starting from the point cloud obtained in the previous step, to obtain the errors of tolerances and the deviations of each of the nodes or points that make up the pieces or parts, by comparing the real piece (cloud of points) with the expected piece (CAD model). Subsequently, a methodology was developed for the recognition of patterns in the process of assembling automobile components. This methodology combines a reinforcement learning algorithm and an artificial neural network, creating an adaptive system for detecting and predicting faults ("Zero defect system") in assembly systems with multiple stations. Finally, a conference paper was included in Cirp Procedia of the conference "Intelligent Computation in Manufacturing Engineering", Naples, Italy, July 19-21, 2017.
- 5** **Entity:** Institute for Production Systems and Design Technology (IPK) **Type of entity:** Public Research Body
Faculty, institute or centre: Fraunhofer
City of entity: Berlin, Berlin, Germany
Start-End date: 30/08/2015 - 28/11/2015 **Duration:** 2 months - 29 days
Funding entity: Ministerio de Economía, Industria y Competitividad **Type of entity:** State agency
City funding entity: Madrid, Community of Madrid, Spain
Name of programme: Ayudas a la movilidad predoctoral para la realización de estancias breves en centros de I+D (FPI)
Goals of the stay: Doctorate



Acquired skills developed: Medición de parámetros geometría y de tolerancia en micro-herramientas y piezas elaboradas; Estudio del proceso de corte de metales en microfabricación; desarrollo de habilidades para el modelado y simulación de procesos

Relevant results: During the foreign stay, the trainee program was focus on the development capabilities to measure workpiece and micro tool using high precision measurement devices such as: Alicona InfiniteFocus, Scanning Electron Microscope. Previously, several artificial computational models were obtained based on data extracted from high precision measurement devices to predict the surface roughness in different alloys; tool geometric parameters and wear behavior in micromachining processes.

Obtained grants and scholarships

Name of the grant: Formacion de Personal Investigador (FPI 2013)

City awarding entity: Madrid, Community of Madrid, Spain

Identify key words: Artificial intelligence; Computer assisted manufacturing; Cognitive behavior and learning; Automatization on manufactured industry

Awarding entity: Consejo Superior de Investigaciones Científicas

Type of entity: State agency

Amount of the grant: 80.000 €

Conferral date: 01/03/2014

Duration: 3 years - 5 months - 22 days

End date: 22/09/2017

Entity where activity was carried out: CENTRO DE AUTOMATICA Y ROBOTICA

Prizes, mentions and distinctions

- 1 Description:** Premio Extraordinario en el Programa de Doctorado en Ingeniería Informática y de Telecomunicación 2016-2017
Awarding entity: Universidad Autónoma de Madrid **Type of entity:** University
City awarding entity: Madrid, Community of Madrid, Spain
Conferral date: 10/12/2018
- 2 Description:** Mejor Tesis Doctoral en Control Inteligente 2017
Awarding entity: COMITE ESPAÑOL DE AUTOMATICA DE LA IFAC
City awarding entity: Badajoz, Extremadura, Spain
Conferral date: 07/09/2018
- 3 Description:** Mención Internacional del Programa de Doctorado de Ingeniería Informática y de Telecomunicación
Awarding entity: Universidad Autónoma de Madrid **Type of entity:** University
City awarding entity: Madrid, Community of Madrid, Spain
Conferral date: 29/09/2017
- 4 Description:** Premio Academia de Ciencia de Cuba 2013 en Ciencias Técnicas
Awarding entity: Academia de Ciencias de la República de Cuba **Type of entity:** Foundation
City awarding entity: La Habana, Cuba
Conferral date: 24/01/2014
- 5 Description:** Mejor Joven Investigador 2013
Awarding entity: Ministerio de Ciencia, Tecnología y Medio Ambiente
City awarding entity: Matanzas, Cuba



CURRÍCULUM VÍTAE NORMALIZADO

4905d293db32f1fa865b0f249c305495

Conferral date: 15/01/2014