

## CURRICULUM VITAE ABREVIADO (CVA)

**IMPORTANT** – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.

### Part A. PERSONAL INFORMATION

First name	Sebastián		
Family name	Dormido Canto		
Gender (*)	Male	Birth date (dd/mm/yyyy)	01/01/1974
Social Security, Passport, ID number			
e-mail	sebas@dia.uned.es	URL Web: <a href="https://www.uned.es/universidad/docentes/informatica/sebastian-dormido-canto.html#investigacion">https://www.uned.es/universidad/docentes/informatica/sebastian-dormido-canto.html#investigacion</a>	
Open Researcher and Contributor ID (ORCID) (*)	0000-0001-7652-5338		

(\*) Mandatory

#### A.1. Current position

Position	Full Professor		
Initial date	28/02/2018		
Institution	Universidad Nacional de Educación a Distancia (UNED)		
Department/Center	Informática y Automática	E.T.S. de Ingeniería Informática	
Country	Spain	Teleph. number	+34 913987194
Key words	Machine Learning, Control Engineering, High Performance Computing		

#### A.2. Previous positions (research activity interruptions, indicate total months)

Period	Position/Institution/Country/Interruption cause
11/03/2003-27/02/2018	Associate Professor (TU), UNED, Spain
30/07/1999-10/03/2003	Associate Professor (TEU), UNED, Spain
15/12/1994-29/07/1999	Assistant Professor, UNED, Spain

#### A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Industrial Engineer (Electronics)	ETSII Universidad Pontificia de Comillas (ICAI)	1994
Doctor in Physical Science	UNED	2001

(Include all the necessary rows)

### Part B. CV SUMMARY (max. 5000 characters, including spaces)

Sebastián Dormido Canto is an Industrial Engineer (Electronics) from the Pontifical University of Comillas, ICAI (1994) and PhD in Physical Sciences from the National University of Distance Education, UNED (2001). He currently works in the Department of Computer Science and Automatic Control of the UNED as full-time university professor since 2018.

His research activity covers different aspects around systems engineering and automation, such as automatic control process, virtual and remote laboratories applied for teaching, high performance computing and machine learning techniques for big databases, specifically thermonuclear fusion databases.

He is co-author of more than 70 publications in journals with impact index (JCR), most of the publications are indexed in relevant positions (Q1 y Q2) and are linked to the development of PhD theses, final master and degree projects. He is co-author of more than 70 publications in

international congresses and conferences, 8 books in teaching subjects university, 7 chapters of books oriented to research and 15 invited international conferences. He has participated in more than 12 competitive research projects (five of them as responsible researcher, IP). He has participated in the signing of 3 research contracts and recently he is a responsible researcher for the agreement signed with Siemens within the framework of the Master of Systems Engineering and Control.

He has recognized three six-year research, four five-year teaching. He has directed 14 doctoral theses and 4 in progress, 20 final degree projects and 16 final master projects. He has made 11 research stages in international centers, highlighting the 18 months during the last years in JET (The Joint European Torus, Culham UK), from 2011, contributing in an active way in the field of prediction of disruptions. The research carried out in recent years has resulted in a predictor of disruptions (APODIS, Advanced Predictor Of DISruptions) based on machine learning algorithms that has been installed in JET's real-time network. The impact of the good results that have been obtained on disruption predictions in the previous projects has recently been reflected in a publication in the journal *Nature Physics* (June 2022).

Also, he is technical advisor for the company ALTER TECHNOLOGY TÜV NORD S.A.U in the project "Extraction and formalization of knowledge about electronic devices subjected to radiation".

Reviewer of international journals: Fusion Engineering and Design, Review of Scientific Instruments, Control System Magazine, IEEE Transactions on Computational Biology and Bioinformatics, Journal of Applied Mathematics, IEEE Transactions on Parallel and Distributed Systems, Sensors, Nuclear Fusion, IEEE Transaction on Education and Expert Systems With Applications.

Evaluator of projects as an expert of the National Agency for Evaluation and Prospective (ANEP) of the Ministry of Economy, Industry and Competitiveness.

From 2013 to 2021 he was head of the Computer Science and Automatic Control Department in UNED.

He is currently Coordinator in the PhD program in Engineering and Control Systems at Computer Science and Automatic Control Department of the UNED since April 2022.

## **Part C. RELEVANT MERITS** (sorted by typology)

### **C.1. Publications** (see instructions)

- Vega J., Murari A., Dormido-Canto S., Rattá G., Gelfusa M., "Disruption prediction with artificial intelligence techniques in tokamak plasmas", <https://doi.org/10.1038/s41567-022-01602-2>, *Nature Physics*, vol. 18, pages 741–750. 2022, ISSN: 1745-2473.
- Farias G., Fabregas E., Martínez I., Vega J., Dormido-Canto S., Vargas H., "Nuclear Fusion Pattern Recognition by Ensemble Learning", *Complexity*, vol. 2021, 1207167, pp: 1-9, 2021, ISSN: 1076-2787.
- Farias G., Fabregas E., Dormido-Canto S., Vega J., Vergara S., "Automatic recognition of anomalous patterns in discharges by recurrent neural networks", *Fusion Engineering and Design*, vol. 154, 111495, pp. 1-5, 2020, ISSN: 0920-3796.
- González S., Dormido-Canto S., Sánchez J., "Obtaining high preventive and resilience capacities infrastructure by industrial automation cells", *International Journal of Critical Infrastructure Protection*, vol. 29, 100355, pp: 1-16, 2020, ISSN: 1874-5482.
- Vega J., Fernández F., Dormido-Canto S., Isayama A., Joffrin E., Matsunaga G., Suzuki T., "Assessment of linear disruption predictors using JT-60U data", *Fusion Engineering and Design*, 2019, vol.146, pp: 1291-1294, ISSN: 0920-3796.
- Farias G., Dormido-Canto S., Vega J., Martínez I., Hermosilla G., Fábregas E., "Image classification by using a reduced set of features in the TJ-II Thomson Scattering diagnostic" Thomson Scattering, *Fusion Engineering and Design*, 2018, vol.129, pp: 99-103. ISSN: 0920-3796.
- Farias G., Dormido-Canto S., Vega J., Martínez I., Alfaro L., Martínez F., "Adaboost classification of TJ-II Thomson Scattering images", *Fusion Engineering and Design*, 2017, vol. 123, pp: 759-763. ISSN: 0920-3796.

- Vega J., Murari A., Dormido-Canto S., Moreno R., Pereira A., Acero A. “Adaptive high learning rate probabilistic disruption predictors from scratch for the next generation of tokamaks”, *Nuclear Fusion*, 2014, vol. 54, 123001 (1-17), ISSN: 0029-5515.
- Dormido-Canto S., Vega J., Ramírez J. M., Murari A., Moreno R., López J. M., Pereira A., “Development of an efficient real-time disruption predictor from scratch on JET and implications for ITER”, *Nuclear Fusion*, 2013, vol. 53, pp.: 1-8, ISSN: 0029-5515.
- Dormido-Canto S., Farias G., Vega J., Pastor I. “Image processing methods for noise reduction in the TJ-II Thomson Scattering Diagnostic”, *Fusion Engineering and Design*, 2012, vol. 87, pp.: 2170-2173, ISSN: 0920-3796.

**C.2. Congress**, indicating the modality of their participation (invited conference, oral presentation, poster)

- Vega J., Murari A., Dormido-Canto S., Rattá G., Gelfusa M., “Predicting and understanding collapse events: tokamak disruptions, an issue for thermonuclear fusion, an opportunity for society”, Invited conference, *6th International Conference Frontiers in Diagnostic Technologies* (ICFDT6), October 19-21, Centro Ricerche Frascati, Italy.
- Vega J., Murari A., Rattá G., Dormido-Canto S., Gadariya D., “Disruption predictors in nuclear fusion by using machine learning methods: an overview”, Oral presentation, *1st Workshop on Artificial Intelligence in Plasma Science*, 20th – 22nd September 2021. Aix-en-Provence, France.
- J. Vega, R. Dormido, S. Dormido-Canto, G. A. Rattá, D. Gadariya, A. Murari. “Prediction of Disruptive Events on the Route to Nuclear Fusion Reactors”, Oral presentation, *ISC High Performance 2021 Conference* (Session: HPC for the Energy Transition). June 24th – July 2nd 2021. ISC-HPC.com.
- J. Vega, R. Dormido, S. Dormido-Canto, G. Rattá, D. Gadariya, A. Murari and JET Contributors. “Comparison of unsupervised methods to determine common patterns in the termination phase of disruptive discharges in JET”, Oral presentation, *4th IAEA Technical Meeting on Fusion Data Processing, Validation and Analysis*. 29th November – 6th December 2021. Virtual Event.
- Esquembre F., Chacón J., Sáenz J., Fábregas E., Farias G., Vega J., Dormido-Canto S., “A programmable web platform for distributed data access, analysis and visualization”, Oral presentation, *13th IAEA Technical Meeting on Control, Data Acquisition and Remote Participation for Fusion Research*, July 5-8, 2021, Culham, United Kingdom.
- Vega J., Dormido-Canto S., Murari A., Rattá G. A., Castro R. and JET Contributors. “Increased warning times in JET APODIS disruption predictor by using confidence qualifiers”, Oral presentation, *2nd IAEA Technical Meeting on Fusion Data Processing, Validation and Analysis*. May 30th – June 2nd, 2017. Cambridge, MA, USA.
- Dormido-Canto S., Vega J., Chacón J., Fábregas E., Farias G., “Distributed collaborative environment for software applications”, Poster presentation, *11th IAEA Technical Meeting on Control, Data Acquisition and Remote Participation for Fusion Research*. May 8-12, 2017. Greifswald, Germany.
- Vega J., Dormido-Canto S., Hernández F., Murari A., T. Cruz, G. A. Rattá. “Disruption prediction: linear equation in two variables as boundary and comparison of predictors”, Invited conference, Presentation to the JET T17-14 working group on ‘Disruption avoidance and plasma termination’. July 11th, 2017. Culham Science Centre. UK.

**C.3. Research projects**, indicating your personal contribution. In the case of young researchers, indicate lines of research for which they have been responsible.

- **Title:** “Modelling of disruption types in thermonuclear plasmas and its recognition by means of machine learning techniques (DISRUPTION-ID)”  
**Reference:** PID2019-108377RB-C32

Funding entity: Spanish Ministry of Science and Innovation (95.590 €)  
Responsible researcher: Sebastián Dormido Canto and Natividad Duro  
Participants: UNED, Ciemat y UPM.  
Date: 01/06/2020 - 31/05/2023  
Main personal contribution: Development of unsupervised classifiers of disruptions

- **Title:** “Tomas de decisión en tiempo real para la selección de métodos de elusión y mitigación de interrupciones en tokamaks (RT-MITELU)”  
**Reference:** ENE2015-64914-C3-2-R.  
Funding entity: Ministerio Economía y Competitividad (84700 €)  
Responsible researcher: Sebastián Dormido Canto.  
Participants: UNED, Ciemat y UPM.  
Date: 01/01/2016 - 31/12/2018.  
Main personal contribution: The study of disruption predictors with the goal of improving prediction in the time of disruption on JET databases with a view on ITER.
- **Title:** “Análisis de Datos basados en aprendizaje automático y sistemas inteligentes de adquisición de datos. Modelos avanzados para entornos de fusión (INTELLECT)”  
**Reference:** ENE2012-38970-C04-03.  
Funding entity: Ministerio Economía y Competitividad (88920 €)  
Responsible researcher: Sebastián Dormido Canto.  
Participants: UNED, Ciemat, UPM y UPC.  
Date: 01/01/2013 - 31/12/2015.  
Main personal contribution: The development of Image processing intelligent methods for noise reduction in the TJ-II Thomson Scattering Diagnostic
- **Title:** “Minería de datos, sistemas de aprendizaje y análisis de validación en grandes bases de datos de fusión termonuclear”  
**Reference:** PREMIO UNED – BANCO SANTANDER (UNED Retos de la Sociedad)  
Funding entity: UNED (12500 €)  
Responsible researcher: Sebastián Dormido Canto.  
Date: 01/01/2015 - 31/12/2016.  
Main personal contribution: The study of automatic recognition of plasma relevant events
- **Title:** “Development of Real Time disruption Prediction”  
**Reference:** WP12-IPH-A07-2.  
Funding entity: EFDA (European Fusion Development Agreement), €  
Responsible researcher: Sebastián Dormido Canto.  
Participants: UNED y CIEMAT.  
Date: 01/01/2012 - 31/12/2012.  
Main personal contribution: The study of disruption causes, detection and prevention strategy high learning rate predictors from scratch on JET databases.

**C.4. Contracts, technological or transfer merits,** Include patents and other industrial or intellectual property activities (contracts, licenses, agreements, etc.) in which you have collaborated. Indicate: a) the order of signature of authors; b) reference; c) title; d) priority countries; e) date; f) Entity and companies that exploit the patent or similar information, if any

- Technical support and training agreement with SIEMENS S.A. dentro del marco del Master de Ingeniería de Sistemas y Control del Dpto. de Informática y Automática, UNED, responsible researchers: S. Dormido Canto y J. Sánchez, signature date: 12/12/2016.
- **Title:** “Fusión por confinamiento magnético: Sistemas de aprendizaje automático”, research contract: 10/296, funding entity: CIEMAT (18538 €), responsible researchers: J. Vega Sánchez (CIEMAT) and S. Dormido Canto (UNED). Dates: 15/11/2010 - 15/11/2011.