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	Authors	Pascale Caulier, Miléna Boclé, SiNANO Paul Wanda, BRME	Version	1.1
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# Research Papers; Proceedings; Presentations and Proposals

Project Number: 965044

Project Acronym: B-CRATOS

Project Title: Wireless Brain-Connect interFfAce TO machines





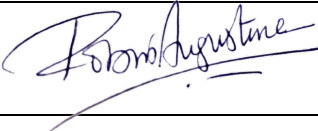
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### Deliverable Information


Project Title:	Wireless Brain-Connect interRfAce TO machineS (B-CRATOS)
Project Number:	965044
Deliverable Number:	D7.3 Research Papers; Proceedings; Presentations and Proposals
Responsible Partner:	SINANO
Work Package Number and Title:	WP7 Exploitation, Communication and Dissemination
Version:	1.1
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**Dissemination Level:** Public

### Approvals

Name, Org.	Role	Signature	Date
Paul Wanda, BRME	Contributor, WP7 Leader		17/07/2023
Pascale Caulier, SINANO	Co-Author, Diss/Comm. Lead		01/07/2023
Robin Augustine, UU	Project Coordinator		17/07/2023




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## Executive Summary

This deliverable gathers an overview of the research papers, proceedings, presentations and proposals connected to the B-CRATOS project. Achievements and knowledge gathered within the B-CRATOS project will be widely disseminated through publications in major international journals and participation of B-CRATOS Partners in international conferences and workshops.

At this stage of the project, there are only a limited number of such outputs, and the IP should be highly considered, therefore this deliverable will be augmented later on as the project will be closer to its final phase.




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## 1 Overview

### 1.1 Purpose

The B-CRATOS members took part and will take part in a number of activities resulting in publications of research papers, proceedings of conferences or proposals. This document lists them in categories.

Scientific publications as continuous and systematic scientific contributions to the selected peer reviewed conferences and journals with high impact play an important part of B-CRATOS.


These works are provided in open access and present the results of research, key aspects of B-CRATOS, and highlight the work of the consortium members as well as gives more visibility to the project itself.

This document is developed under the Legal obligations outlined in Articles 28 and 29 of the Horizon 2020 Model Grant Agreement.

### 1.2 B-CRATOS Partners

Short Name	Full Name
UU	Uppsala Universitet
SINANO	SINANO Institute
SSSA	Scuola Superiore di Studi Universitari e di Perfezionamento S'Anna
BRME	Blackrock Microsystems Europe GmbH
LINKS	Fondazione LINKS – Leading Innovation & Knowledge for Society
DPZ	Deutsches Primatenzentrum GmbH
NTNU	Norges Teknisk-Naturvitenskapelige Universitet NTNU



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### 1.3 Responsibilities

BRME is the lead beneficiary responsible for WP7 Exploitation, Communication and Dissemination and is the lead Partner responsible for coordinating exploitation activities.

SiNANO is the beneficiary responsible for internal and external communication and dissemination coordination and activities.

UU is the beneficiary responsible for dissemination through publications validation and coordinating the filing of patents.

Prof. Robin Augustine (UU) is the scientific coordinator assuming overall project, scientific, and technical responsibility of the project. As B-CRATOS coordinator, Prof. Augustine reviews, approves, and submits deliverables and reports.


### 1.4 Definitions

Term	Description
B-CRATOS	the Wireless Brain-Connect interRfAce TO machineS project
Dissemination	sharing research results with potential users – peers in the research field, industry, other commercial players, and policymakers, often through public disclosure in scientific or technical language
WP	Work Package

### 1.5 References

1. Grant Agreement number 965044, B-CRATOS, H2020-FETOPEN-2018-2020 / H2020-FETOPEN-2018-2019-2020-01, Annex 1 (part A), Research and Innovation action, *unpublished*
2. B-CRATOS Consortium Agreement, version V5, 2021-02-26. *unpublished*



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## 2 Journal, Articles and Thesis

Open access to publications is ensured, either by publishing in open-access journals or by choosing the open access option for specific articles in traditional subscription journals. The Consortium will mainly use the “green access” model; creating a self-archived version of any article published by the Partners and the B-CRATOS users in any journal for free public use, in a repository accessed through the B-CRATOS Portal within 6 months of publication.

### 2.1 Journal Papers and Articles

B-CRATOS partners have been targeting high impact journals and magazines in the field. The full list of conference papers either submitted or accepted so far is given below.


- SSSA, “Looking for synergies in healthy upper limb motion: a focus on the wrist”, IEEE Transactions on Neural Systems and Rehabilitation, 2023  
<https://doi.org/10.1109/TNSRE.2023.3243785>
- DPZ, “Distributed yet compartmentalized neural dynamics of hand actions”, Hansjörg Scherberger, Neuron <https://doi.org/10.1016/j.neuron.2021.12.02>
- UU, “Realization of a Portable Semi-Shielded Chamber for Evaluation of Fat-Intrabody Communication”. In review at IEEE Access.  
(Submitted)
- UU, “90 Mb/s fat-layer intra-body communication (Fat-IBC) with low-cost WLAN hardware”, IEEE Transactions on Biomedical Engineering.  
(Accepted, publication pending)

### 2.2 Thesis

Two theses have already been performed in the framework of the B-CRATOS project:

- Elios Ghinato, supervised by Paolo Viviani (LINKS), “Robust classification of a neuromuscular signal for real-time control of a prosthetic hand”, Master’s thesis, 2022  
<https://webthesis.biblio.polito.it/25770/>
- Ilaria Gesmundo, supervised by Paolo Viviani (LINKS), “Real-time classification of neural signal from motor cortex through multiple recording sessions”, Master’s thesis, 2023  
<https://webthesis.biblio.polito.it/26139/>



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### 3 Conferences (Proceedings, Posters and Invited Talks)

Diverse talks and presentations have been made in conferences or as Invited lectures since the start of the project to present B-CRATOS and its very first results. In particular, all achievements and knowledge gathered within the B-CRATOS project were disseminated through publications and participation of B-CRATOS members in international conferences and workshops. We list them below.


#### 3.1 Invited/ Guest Lectures

Invited lectures and talks are also very important for the visibility of the B-CRATOS project. Twelve Invited/Guest Lectures were given by key B-CRATOS members during these two first periods of the project, as indicated below:

<b>Title of the Invited Presentations</b>	<b>Audience (nb of people)</b>
• R. Augustine (UU), ‘Brain machine interface and the age of cyborgs’, UppTalk weekly, Online, April 2021.	60
• A. Khaleghi (NTNU), ‘Guest lecture: Wireless communication techniques for WBAN focused on Implant devices’, Lecture on UU WBAN Course by NTNU, Online, May 2021	16
• R. Augustine (UU), ‘FET Open proposal: The challenges you can meet and be friends with’, Webinar on upcoming funding opportunities within EIC Pathfinder in Horizon Europe, Online, June 2021.	20
• M. Controzzi (SSSA), ‘Guest lecture: Introductory lecture to BCI applied to prosthetic’, SSSA joint lecture, master programs in Bionics Engineering and Biomedical Engineering, Pisa, Italy, October 2021.	90
• P. Wanda (BRME), ‘Guest Lecture: BCI’, UU Robotics Course Lecture, Hybrid/Pisa, Italy, October 2021.	40
• L. Bergamasco (LINKS), ‘Applying data science techniques to biological and medical problems – Experiences from regional and European Research projects’, Bioinformatics course, Politecnico di Torino, Italy, May 2022.	70
• M. Controzzi (SSSA), invited lecture, ‘Artificial hands for action en perception: from the functional substitution to the human robot collaboration’, Summer School of Neuroengineering, Genova, Italy,	100





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July 2022.

- P. Wanda (BRME), 'Guest Lecture: BCI', UU Robotics Course Lecture, Hybrid/Uppsala, Sweden, October 2022. 40
- A. Agudelo-Toro (DPZ), 'BCI control through progressive training of manifold latents (ProTML)', Behavioural Neuroscience and Neuroprosthetics Online, January 27, 2023. 15
- R. Augustine (UU), 'Fat-intra body communication: a new paradigm for intra-body communication technology enabling reinstatement of lost functionalities in human', Recent Trends in Electromagnetics and Optics, India, January 2023. 40
- Zh. Zhang (UU), 'Neuromorphic tactile sensors', 6<sup>th</sup> International Conference on Nanoenergy and Nanosystems, China, June 2023.
- A. Agudelo-Toro (DPZ), 'Accurate neuroprosthetic control via neural manifold shaping', 10th International BCI Meeting, Brussels, June 2023. 450

### 3.2 Conference Papers, Proceedings


B-CRATOS Partners regularly attend scientific conferences and give presentations of B-CRATOS results, including the presentation of keynote speeches.

Twelve publications produced by B-CRATOS partners with acknowledgement of B-CRATOS were accepted for Conference Proceedings:

#### Title of the Presentations

- A. Agudelo-Toro, H. Scherberger (DPZ) 'Data Sharing: Monkey multi-electrode array recordings and Neo', NFDINEuro 5th Community Workshop, Online, July 2021.
- A. Agudelo-Toro (DPZ), 'Intention is all you need (to train a high-accuracy grasping iBCI)', 3rd BCI-Unconference, Online, January 2022.
- Zh. Zhang (UU), 'Neuromorphic e-skin', 6<sup>th</sup> NENS, Beijing, China, June 2022
- Zh. Zhang (UU), 'Tactile sensors', NGPT2022, Online, June 2022.
- A. Varalda (SSSA), 'Preliminary activities towards a battery consume optimization algorithm for prosthetic hand, MEC2022, Fredericton, Canada, August 2022.
- A. Khaleghi (NTNU) 'Success story of B-CRATOS and experience with grant funding',



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ACM NanoCOM, Barcelona, Spain, October 2022.

- Varalda, B. Kabashi and M. Controzzi (SSSA) ‘Preliminary activities towards a battery consume optimization algorithm for prosthetic hand’, Myoelectric Control Symposium 2022 - MEC2022, 2022.

<https://www.unb.ca/ibme/assets/documents/mec22proceedings2.pdf>

- R. Gaffoglio (LINKS & UU) Pixel Optimization via Genetic Algorithm of a Flat Epidermal Antenna for Fat Channel Communication, EuCAP2022, Madrid, Spain, April 2022

<https://doi.org/10.36227/techrxiv.21200050.v1>

- P. Viviani (LINKS, DPZ), ‘Deep Learning for real-time neural decoding of grasp’, ECML PKDD, September 2023.

TBA

- Ted Johansson, Pramod Rangaiah, Johan Engstrand, Mauricio Perez and Robin Augustine (UU), ‘Fat-layer intra-body communication’ (Submitted to SMWD2023 (Swedish Microwave Days 2023)).

Submitted

- Khaleghi, A., Hasanvand, A., Balasingham, I. (NTNU), ‘Design and Implementation of a Hybrid Wireless Power and Communication System for Medical Implants’. (Submitted to 2023 IEEE MTT-S International Microwave Biomedical Conference (IMBioC))

Submitted

- Hasanvand, A., Khaleghi, A., Begeuet, C., Wanda, P., Balasingham, I. (NTNU & BRME) ‘Advancing Brain-Machine Interfaces: High Data Rate Battery-Free Implants’. (Submitted to 2023 IEEE MTT-S International Microwave Biomedical Conference (IMBioC))


Submitted

### 3.3 Poster Presentation & Others

We can also highlight that four posters produced by B-CRATOS partners with acknowledgement of B-CRATOS support were also presented so far at Conferences or Events:

- R. Gaffoglio (LINKS), B-CRATOS poster at EUCAP 2022, Spain, April 2022.
- A. Agudelo-Toro (DPZ), Poster and presentation ‘An intention-based strategy for grasping prosthesis’, The Society for the Neural Control of Movement Annual Meeting,



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Dublin, Ireland, July 2022.


- R. Gaffoglio & P. Viviani (LINKS), B-CRATOS presentation, ESRs' visit of the research lab of Fondazione LINKS and Politecnico di Torino, Torino, Italy, September 2022.
- L. Bergamasco & R. Gaffoglio (LINKS), B-CRATOS presentation at Biennale Tecnologi, Torino, Italy, November 2022.

## 4 Proposals

The scientific findings and technological advances made possible by the B-CRATOS project will be publicly disclosed in peer-reviewed scientific journals. The targeted journals cover a broad range of topics in wireless signalling, prosthetics, physics, neuroengineering, machine learning and computational techniques, and prosthetics, and some of the targeted ones are listed (non-exhaustive) below, organized by topic:

Topic	Journal	Open Access Policy
Wireless Technologies: Wireless Implant Technologies, Fat-IBC (WP2, WP3)	IEEE Transactions on Antennas and Propagation	Open Access with extra fee
	IEEE Transactions on Biomedical Circuits and Systems	Open Access with extra fee
	IEEE Transactions on Biomedical Engineering	Open Access with extra fee
	IEEE Transactions on Microwave Theory and Techniques	Open Access with extra fee
	IEEE Access	Fully Open Access
	Nature: Scientific Reports	Fully Open Access
Machine Learning and Artificial Intelligence (WP4)	IEEE Transactions on Pattern Analysis and Machine Intelligence	Open Access with extra fee
	Nature: Machine Intelligence	Open Access with extra fee
Robotics, Prosthetics (WP4)	Journal of Neuroengineering and Rehabilitation	Fully Open Access
	IEEE Transactions on Neural Systems and Rehabilitation Engineering	Fully Open Access
Electronic Skin and Sensors (WP4)	Nano Energy	Open Access with extra fee
Neuroengineering, Neuroscience (WP6)	Journal of Neuroengineering	Open Access with extra fee
	Journal of Neuroscience	Open Access with extra fee



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	eLife	Fully Open Access
B-CRATOS System (all WP)	IEEE Communications Magazine	Subscription Required

**Table 1.** Journals where results are expected to be submitted for publication in the coming reporting period.

The number of publications will increase in the forthcoming months as more technical results will be obtained and we will be able to publish more of them, respecting the confidential data linked to the IP.

Additional conference, symposium, and trade show opportunities will be identified as the project progresses and evaluated for suitability for the information to be disseminated or exploitation activities.

## 5 Revision history

REVISIONS			
Version #	Date	Type of Change	Lead Authors
1.0	30-06-2023	First report	Pascale Caulier / Miléna Boclé
1.1	01-07-2023	First finalized report	Pascale Caulier / Miléna Boclé

