



Solid-liquid thermoelectric systems with uncorrelated properties

## Deliverable 6.1

### Project website and social media profiles

H2020-EU.1.2.1. - FET Open

FETOPEN-01-2018-2019-2020 - FET-Open Challenging Current Thinking




Grant Management 863222

Type of Action: RIA

Start Date: 01 Jan 2020

Duration: 48 months

#### Project partners

LOGO	Partner full name	Acronym
	Universitat Jaume I	UJI
	Institut de Recerca en Energia de Catalunya	IREC
	Kungliga Tekniska Hogskolan	KTH
	University of Warwick	UW
	Solvionic	SOLV
	InteNanoMat	INM

**Deliverable Name:** Project website and social media profiles

**Led by:** UJI

**Partners:** All

## **Index**

1	Introduction .....	2
2	Branding image .....	2
2.1	Logo .....	2
3	Website .....	2
4	Social Networks .....	5
4.1	ResearchGate .....	5
4.2	LinkedIn .....	6
4.3	Twitter .....	7
4.4	YouTube .....	7
5	Conclusions and final remarks .....	7

## **Figure index**

Figure 1.	Final version of the logo .....	2
Figure 2.	Heading and footer of the website .....	2
Figure 3.	Index (left) and Project (right) pages .....	3
Figure 4.	Part of the partners page (left), and the documents (top right), media, news & events (middle right) and contact (bottom right pages) .....	4
Figure 5.	Interactive Map of the Location of the Partners.....	4
Figure 6.	Google Drive-based Intranet.....	5
Figure 7.	Screenshot of the UncorrelaTEd ResearchGate website .....	6
Figure 8.	Screenshot of the UncorrelaTEd LinkedIn page (left) and analytics (right) .....	6
Figure 9.	Screenshot of the UncorrelaTEd Twitter account details .....	7
Figure 10.	Screenshot of the UncorrelaTEd YouTube account .....	7

## 1 Introduction

This report describes the main activities performed to create the project website and the social media profiles. These activities are part of Task 6.1 from WP6 - Management and dissemination.

## 2 Branding image

### 2.1 Logo

The communication office of UJI in collaboration with the UJI team has designed different options for the logos of the project. Then, one version was selected, and different modifications were made to it. The final version of the logo is shown in Figure 1 and contains the name of the project (UncorrelaTEd), and a plug with the symbols corresponding to the Seebeck coefficient and the electrical conductivity being disconnected, representing the idea in which this project is based, break the adverse correlation between these properties. Blue and red are the colours selected for the visual identity of the project, since this combination represents that electricity is generated from a temperature difference (hot and cold sides).



Figure 1. Final version of the logo

## 3 Website

A dedicated webpage has been created as part of the dissemination and communication activities. The website address is <http://uncorrelated.uji.es/> making use of the hosting of the Coordinator's institution (UJI). Although not in use yet, the address <http://www.uncorrelated.eu/> has already been reserved with one domain registrar, and in two months to another registrar server, since the initial one did not offer the possibility of creating registers inside the DNS to continue using the UJI hosting.

The main heading of the website shows the name of the project and a short description, the logo, the social media links and the intranet. Moreover, the main navigation menu of the website and a search button are included. At the bottom part of the website, legal pages and information are included, together with a disclaimer. This is shown in Figure 2.

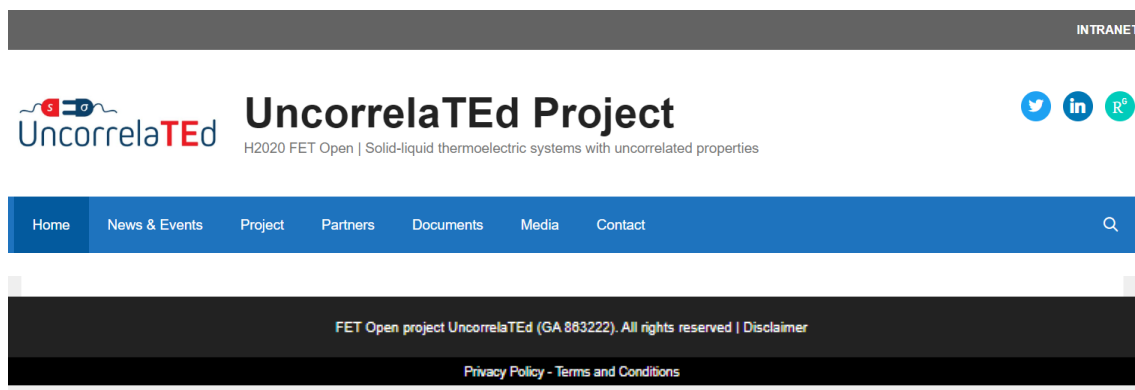


Figure 2. Heading and footer of the website

The information contained in the website has been distributed in different pages, namely:

- **Index** (Figure 3): Starts with an image that illustrates the project aim. Then, it follows a general and brief description of the project. At the end, EU acknowledgements and disclaimer are shown.
- **Project** (Figure 3): A more extended information about the project appears in this section, together with a graphical abstract and the link to Cordis.

**UncorrelaTEd** is the acronym of the H2020 European Union project **Solid-liquid thermoelectric (TE) systems with uncorrelated properties**. This project aims at reaching unprecedented improvements in the heat-to-electricity energy conversion efficiency employing (TE) materials.

One of the main problems of the TE technology is the adverse correlation that exists between the properties that determine how good a TE material is. These properties are the Seebeck coefficient (S), the electrical conductivity ( $\sigma$ ), and the thermal conductivity ( $\lambda$ ). Specially difficult is to **break the correlation between S and  $\sigma$** . UncorrelaTEd will achieve this introducing a new concept in thermoelectricity, which is based on the **combination of a TE solid material with a tactically designed electrolyte** (liquid with ions), bringing together **thermoelectricity and electrochemistry**.

UncorrelaTEd concept will be implemented in different families of TE materials (**bismuth telluride alloys, oxides, and polymers**), and will potentially lead to an extraordinary powerful technology with unprecedented efficiencies in the heat-to-electricity energy conversion. **UncorrelaTEd** outcomes will enable the TE technology to be implemented in many areas, such as self-powered sensors for the internet of things, empowering the elimination of batteries, textiles, factories, and power plants.

UncorrelaTEd is funded by the H2020 European Programme, under the Future and Emerging Technologies Open (FET-Open) Scheme, Challenging Current Thinking, corresponding to a Research and Innovation Action.

Project duration	Scientific disciplines	Participants
From 1 January 2020 to 31 December 2023	<ul style="list-style-type: none"> <li>thermoelectricity</li> <li>electrochemistry</li> <li>inorganic chemistry</li> <li>organic chemistry</li> <li>ionic liquids</li> <li>computational simulations</li> </ul>	<ul style="list-style-type: none"> <li>Universitat Jaume I</li> <li>IREC</li> <li>KTH Royal Institute of Technology</li> <li>University of Warwick</li> <li>Solvionic</li> <li>Intenanomat</li> </ul>



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**Disclaimer:** This website reflects only the author's view and that the European Commission is not responsible for any use that may be made of the information it contains

#### Heat to generate electricity

More than 60% of the global power is lost as waste heat, which represents around 15 TW of power. A 10% recovery of this waste heat will exceed the summation of most current renewable energy sources (solar, wind, geothermal, and hydro energy). In addition to the waste heat, ubiquitous heat sources such as the sun or even our own bodies are widely available. Thermoelectric (TE) devices can directly convert heat into electricity under safe, clean, and environmentally friendly operation. They are solid-state devices with no moving parts, reliable operation, and requiring no maintenance.

#### The yet unsolvable problem of thermoelectricity

Despite large efforts to identify better TE materials, still, the TE technology is limited by low efficiency. One of the two performance improvement routes, thermal conductivity reduction, has already reached its amorphous limit, which makes the other route, power factor (PF) improvements, crucial. Current strategies targeting PF enhancement have only reached modest improvements, mainly due to the adverse interdependence of the Seebeck coefficient (S) and the electrical conductivity ( $\sigma$ ), which produces a decrease in one of these properties if the other is increased. This is a serious obstacle to achieve the widespread application of the TE technology, since  $PF \propto S^2$ .

#### UncorrelaTEd concept

UncorrelaTEd will come true the dream of breaking the S- $\sigma$  correlation by introducing a new paradigm in thermoelectricity that comes from the connection of thermoelectricity and electrochemistry using a properly designed hybrid system, formed by a porous TE solid permeated by a liquid electrolyte. The porous solid provides a low thermal conductivity, whereas the electrolyte tactically interacts with the solid to enhance the PF. Unprecedented PF improvements (above 35 times) have already been observed by UncorrelaTEd members in this system using a material with modest TE properties. UncorrelaTEd aims at extending these improvements to different materials (bismuth telluride alloys, oxides, and polymers) with state-of-the-art TE properties, potentially leading to an extraordinarily powerful technology able to provide more than 4 times larger PF than state-of-the-art low-mid temperature ( $\sim 150$  °C) materials.



#### UncorrelaTEd impact

Due to the wide availability of low-grade heat, UncorrelaTEd results will be applied in many sectors. All machines from jet engines to microprocessors generate heat, as do manufacturing, domestic, and even biological processes. For example, the internet of things development, which will lead to a new concept of society (society 5.0) with unprecedented benefits, is currently seriously limited by the use of batteries. UncorrelaTEd technology will lead to self-powered sensors (e.g. body heat, industrial exhausts, environment), alleviating the need of batteries and their associated maintenance costs and harmful environmental impact. Textiles are another sector, where TE materials can be integrated to power devices such as implantable electronics and wireless monitoring systems for health care.

UncorrelaTEd site at Cordis

Figure 3. Index (left) and Project (right) pages

- **Partners** (Figure 4): Main information about each member of the consortium is shown here, containing the name of the group/department/laboratory and university, logos, links of interest, expertise, a short description of the tasks for each partner, and a description of the principal investigator. At the bottom of this section, a picture of the people from the consortium is included.
- **Documents** (Figure 4): This section includes any public document with open access of general interest generated by the project. Two subsections are included: deliverables and publications.
- **Media** (Figure 4): A YouTube miniature of the videos planned to record during the development of the project will be inserted in this section. For the moment, this section has no content, since no videos have been recorded yet.
- **News & Events** (Figure 4): All the news related to the project, and all the main events will be announced here. It will be coordinated with the Social Media activity, and in general, similar posts will be included.

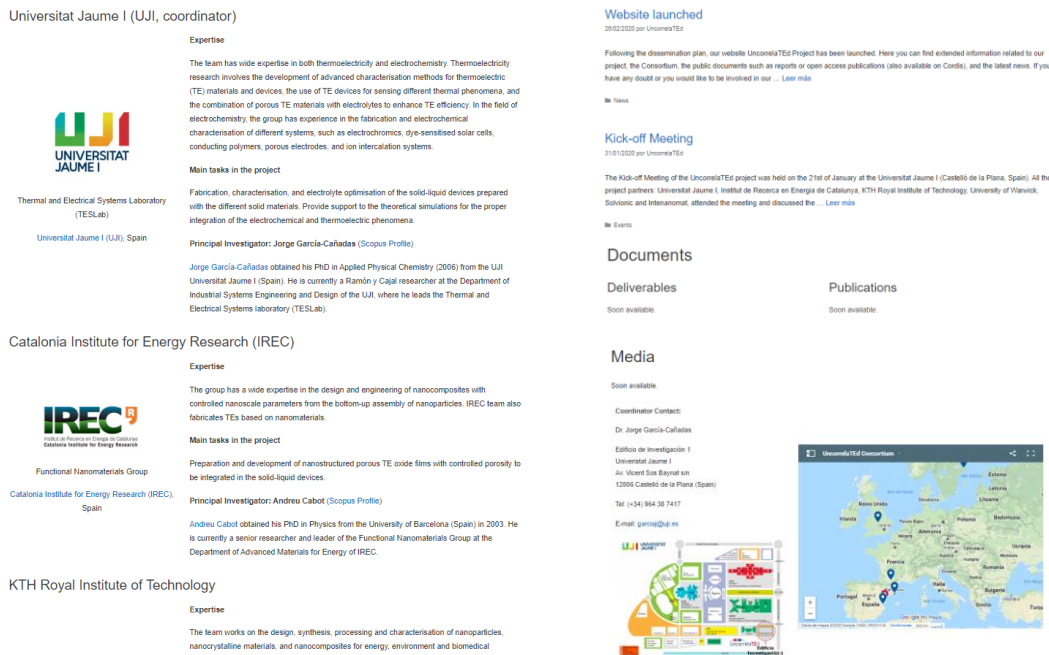


Figure 4. Part of the partners page (left), and the documents (top right), media, news & events (middle right) and contact (bottom right pages)

- **Contact** (Figure 5): Contact details with a map of the location of the Coordinator office in the UJI campus is presented in this section. Contact through the website will be directly managed through the Coordinator’s e-mail (garcaj@uji.es). Moreover, an interactive map with the location of each partner has been created with Google Maps (Figure 5) and added directly to the section.

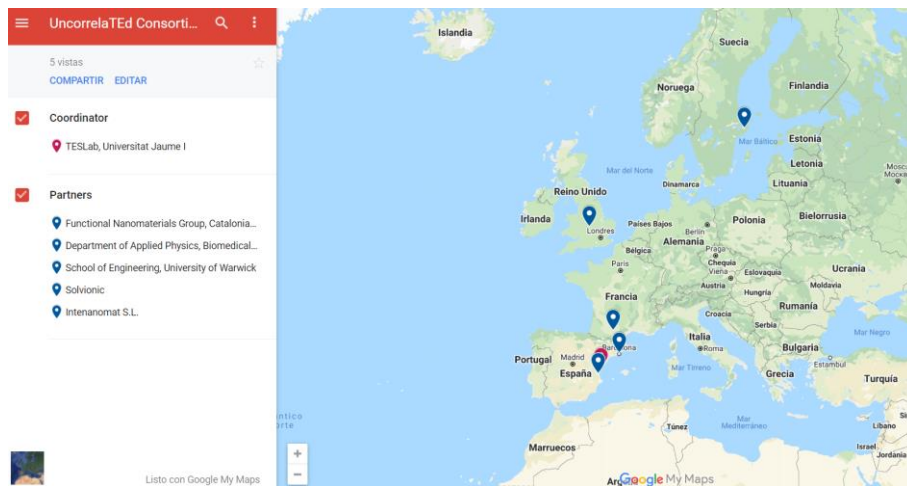


Figure 5. Interactive Map of the Location of the Partners

The link for sharing the map is the following, and is managed by the Coordinator:

<https://drive.google.com/open?id=1Y25IU1fsK3UOc3OtblRobC1D1FUkOS2i&usp=sharing>

Additionally, a private intranet platform which contains the files necessary for the development of the project has been created in Google Drive (Figure 6). The Coordinator will edit this folder, and the rest of the partners will have access to read and download the files. Public access is blocked.

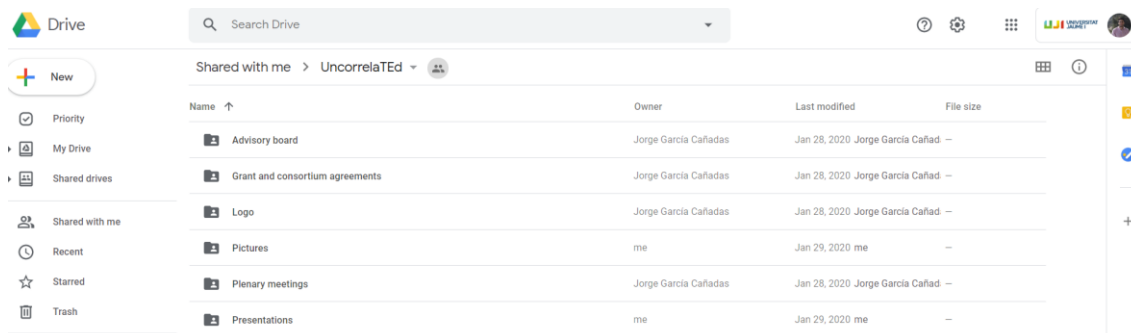


Figure 6. Google Drive-based Intranet

## 4 Social Networks

Different social media profiles have been created to reach the widest possible audience, (i) ResearchGate for a more scientific network, (ii) LinkedIn targeting professional audience, and (iii) Twitter for the general public. The first posts are already available informing about the celebration of the kick-off meeting and interactions (follows, sharing posts, recommendations, etc.) with other users already started. All communication actions through the UncorrelaTEd's social networks will be managed by the Coordinator, as the leader of the WP6.

### 4.1 ResearchGate

ResearchGate is the largest academic, social networking site for scientists and researchers to share papers, ask and answer questions, and find collaborators. The resulting address for the project is <https://www.researchgate.net/project/UncorrelaTEd-Solid-liquid-thermoelectric-systems-with-uncorrelated-properties> (Figure 7). The collaborators have been added to the project, and also a short description of the goal of the project, and the paper that originated the motivation of the project. In the following months, open access papers will be included and linked to the project.

## UncorrelaTEd - Solid-liquid thermoelectric systems with uncorrelated properties

Adrián Mota-Babiloni · Braulio Beltrán-Pitarch · Jorge García-Cañadas · [Show all 12 collaborators](#)

Goal: UncorrelaTEd aims at reaching unprecedented improvements in the thermoelectric (TE) power factor ( $S\sigma^2$ ) by breaking the adverse correlation between the Seebeck coefficient (S) and the electrical conductivity ( $\sigma$ ) in different families of TE materials (bismuth telluride alloys,...

[Show details](#)

The screenshot shows the 'Introduction' section of the project page. It includes a navigation bar with 'Overview', 'Project log', 'References (1)', and 'Questions'. The main content area has a title 'Introduction' and a subtitle 'Introduce your project to your audience to tell them what your research is about.' Below this, there are two boxes. The left box is titled 'Goal' and contains the text: 'UncorrelaTEd aims at reaching unprecedented improvements in the thermoelectric (TE) power factor ( $S\sigma^2$ ) by breaking the adverse correlation between the Seebeck coefficient (S) and the electrical conductivity ( $\sigma$ ) in different families of TE materials (bismut...'. There is an 'Edit' button below the goal text. The right box is titled 'Add hypothesis' and contains the text: 'Tell your audience what you expect to find out.' It features an icon of a document with a question mark and a plus sign.

Figure 7. Screenshot of the UncorrelaTEd ResearchGate website

### 4.2 LinkedIn

The project has been created as a page in LinkedIn (<https://www.linkedin.com/company/36989946/>) so that the users can follow its last updates. Information related to the project has been included: Description, duration, location of the partners, link to the website, etc. The main information of the page associated with UncorrelaTEd can be seen in Figure 8.

The screenshot shows the LinkedIn page for 'UncorrelaTEd FET Open Project'. The header features a collage of terms: 'electrolytes', 'self-powered sensors', 'energy generation', 'thermoelectrics', 'electrochemistry', 'emerging technology', 'heat-to-electricity', 'ionic liquids', 'Power Factor', and 'solid-liquid systems'. The page includes a 'Visit website' button, an 'About' section with an overview of the project, and a 'Featured groups' section listing 'Thermoelectrics' (380 members) and 'Waste Heat Recovery' (959 members). On the right, there is an 'Analytics' section showing 'Last 30 day activity' with 17 unique visitors (466% increase), 7 new followers (0% increase), 417 post impressions (0% increase), and 5 custom button clicks (0% increase).

Figure 8. Screenshot of the UncorrelaTEd LinkedIn page (left) and analytics (right)

### 4.3 Twitter

A Twitter account (<https://twitter.com/UncorrelaTEdFET>) has been created for communication purposes to general and scientific audiences. The account is @UncorrelaTEdFET because another company already took @Uncorrelated. The hashtag #UncorrelaTEdFET will be used in all communication actions through this social network. Again, selected information is included to help people identify the project, as shown in Figure 9.

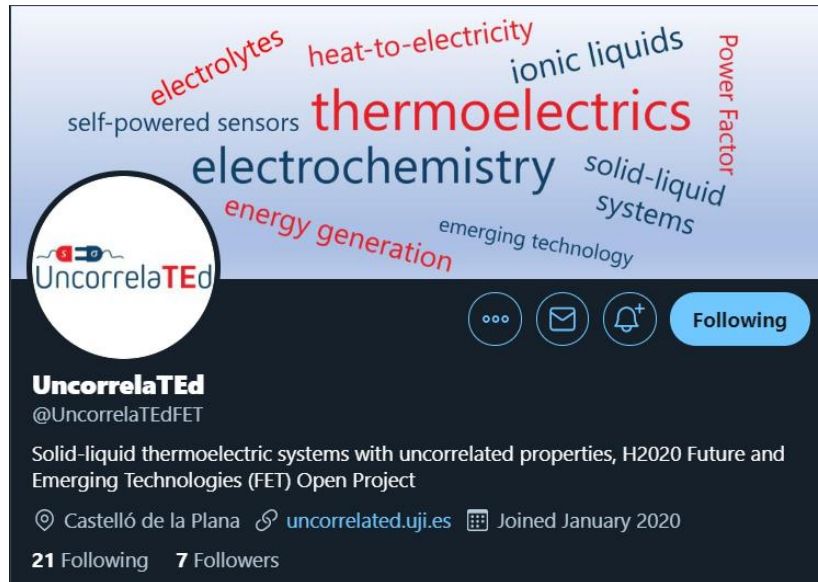


Figure 9. Screenshot of the UncorrelaTEd Twitter account details

### 4.4 YouTube

Finally, a YouTube channel ([https://www.youtube.com/channel/UC-jM\\_pj2-21toFy0pLNNkxg?view\\_as=subscriber](https://www.youtube.com/channel/UC-jM_pj2-21toFy0pLNNkxg?view_as=subscriber)) is created to upload videos and make them publicly available. The profile of this channel is presented in Figure 10.

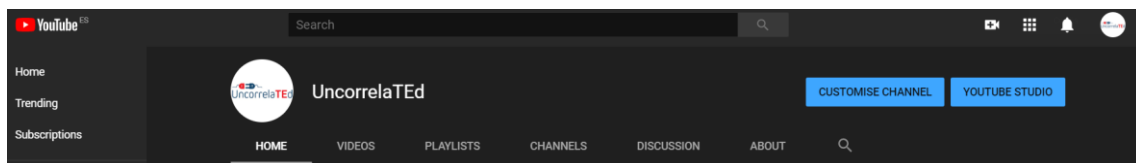


Figure 10. Screenshot of the UncorrelaTEd YouTube account

## 5 Conclusions and final remarks

For communicating UncorrelaTEd activities and results, a simple and visual website has been created. In addition, profiles have been registered in social networks addressed to different types of audience. The priority is to provide clear and complete information and allow the possibility of navigating between the different social networks and website. Regular publication of posts (news) will show the last activities of the project and will keep the attention of the potential audience. The project website and social networks offer the possibility of checking parameters about the interaction with visitors, and this will be used to monitor the project interest.