

# The European Chemical Engineering Skills Pipeline

One of the things I committed to do as EFCE Scientific Vice President was to explore whether the ecosystem for developing Chemical Engineers in Europe is optimal and consistent. Student recruitment is buoyant but age profiles within the academic community are quite diverse across Europe. By bringing together some statistics of age profiles and staff student ratios I hope to build a picture of good practice. This will help national Member Societies in EFCE member countries and Universities to argue for more academic recruitment to maintain a strong discipline basis for Chemical Engineering in each country, if it is out of line with best practice.

I asked Member Societies to give fine numbers about teaching for Chemical Engineering degrees in Universities in their country. There is some information on Eurostat but the definitions and processes used were very out of line with how we define Chemical Engineering. As you might expect the way Chemical Engineering education is organized differs between countries. Chemical Engineering can embrace Chemical Technology, Process Chemistry, Process Biotechnology etc.. My approach was to allow countries to define for themselves how they would draw the envelope around Chemical Engineering. I asked them to include those courses that graduate what they recognize broadly as Chemical Engineers and not those that include only a small element of Chemical Engineering.

Fig 1 shows the data for the countries I have been able to get data for. It is data mostly for 2018 and the degree of accuracy is variable. However we are looking for significant trends so I consider that an Engineering approximation gives sufficient accuracy.

The raw data obtained (shown in Fig 1.) gives numbers of teaching staff (Full Time Equivalent) including academic staff, assistants, and teaching fellows but not postgraduates and postdocs who teach unless it is a major part of their responsibilities; the average age of the Chemical Engineering teaching staff; the total number of students within



Welcome to the April 2021 issue of the EFCE News. If you have any comments on the newsletter please get in touch.

*Hermann Feise*  
EFCE President

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Chemical Engineering Departments in all years (ie including Bachelor, Masters and PhD but not post experience short courses); and the number of graduating Chemical Engineers with degrees (only B and M level) for the most recent year available. From this I have calculated the student/staff ratio, the number of Chemical Engineering Graduates per 100,000 population and the number of graduates per 1000 in the national Chemical industry workforce as reported to CEFIC. These are shown in the subsequent tables in rank order.

Comparisons between countries need to be made with care. The total numbers of staff and students for each country needs to be considered with respect to the breadth of courses considered, the industrial base of the country, the duration of the courses included and the extent of recruitment of Chemical Engineers to employment beyond the traditional industries of chemicals, pharmaceuticals, oil and gas.

While bearing these issues in mind and recognising that there is no ideal profile, we can look at some overall trends. Countries are producing very different numbers per head of population and per 1000 in the chemical industry workforce. Portugal's industry is relatively small but is producing graduates going into a wide range of industries and careers. Countries with relatively low numbers could reflect whether they are indeed producing enough Chemical Engineers for the wide

range of career options that are available. The student/staff ratio varies very considerably from around 17:1 to 6:1 (the figure for Ukraine is a clear outlier based I think on different assumptions). Some of this may reflect how teaching staff are defined but the range is striking. The average age of staff is not so wide but it does reflect the lack of investment in new academic staff that has been reported by colleagues in Ukraine, Italy and Greece. I hope these comparisons could help them make a stronger case for investment in new teaching staff at their Universities.

It was surprisingly difficult to collect the data as most of our Societies do not collect this information and so in some cases I used personal contacts within the education systems.

I will write a further article later in the year when we have more data particularly from Germany which has a very sizeable Chemical Engineering education activity. Germany does collect data but it is not disaggregated from Mechanical Engineering so a new survey is in train. Other EFCE member countries with no figures so far are Bulgaria, Estonia, Finland, Hungary, Latvia, Russia, Serbia, Turkey, and Norway and just partial figures for Ireland. Many thanks to many colleagues who helped me in collecting and assembling these data.

*David Bogle*  
EFCE Scientific Vice President

	Teaching staff	Average age of staff	Students (B,M&D)	Student/staff ratio	Graduates (B,M)	Grads per 100K population	Grads per 1000 Chem Ind workforce
<i>Croatia</i>	69	46	1032	15.0	179	4.2	3.0
<i>Czech R</i>	409	49.5	4296	10.5	550	5.3	4.2
<i>Denmark</i>	67	44	442	6.6	171	3.1	16.0
<i>France</i>	550		4360	7.9	1550	2.3	9.3
<i>Greece</i>	62	54	1079	17.4	135	1.2	10.0
<i>Italy</i>	400	55	5500	13.8	1375	2.3	12.5
<i>Lithuania</i>	40	45.2	248	6.2	55	1.9	8.7
<i>Netherlands</i>	166.3	48	2900	17.4	974	5.8	17.1
<i>Poland</i>	458	51.4	2540	5.5	580	1.5	1.8
<i>Portugal</i>	302	53.4	2853	9.4	565	5.3	38.7
<i>Romania</i>	360	46.2	3010	8.4	770	3.9	34.2
<i>Slovakia</i>	22.5	49	158	7.0	52	2.5	1.1
<i>Slovenia</i>	35	45	600	17.1	150	7.3	4.8
<i>Spain</i>	900	43-47	11600	12.9	2500	5.3	12.7
<i>Sweden</i>	135	45	1300	9.6	202	2.1	3.9
<i>Switzerland</i>	110	46	810	7.4	260	3.3	3.7
<i>UK</i>	1028	45	16030	15.6	4206	6.3	27.5
<i>Ukraine</i>	194	57	462	2.4	70	0.17	

Figure 1 – Staff and student figures for Chemical Engineering

	<b>Average age of staff</b>
<i>Denmark</i>	44
<i>Slovenia</i>	45
<i>Sweden</i>	45
<i>UK</i>	45
<i>Spain</i>	43-47
<i>Lithuania</i>	45.2
<i>Croatia</i>	46
<i>Switzerland</i>	46
<i>Romania</i>	46.2
<i>Netherlands</i>	48
<i>Slovakia</i>	49
<i>Czech R</i>	49.5
<i>Poland</i>	51.4
<i>Portugal</i>	53.4
<i>Greece</i>	54
<i>Italy</i>	55
<i>Ukraine</i>	57
<i>France</i>	N/A

	<b>Student/staff ratio</b>
<i>Greece</i>	17.4
<i>Netherlands</i>	17.4
<i>Slovenia</i>	17.1
<i>UK</i>	15.6
<i>Croatia</i>	15
<i>Italy</i>	13.8
<i>Spain</i>	12.9
<i>Czech R</i>	10.5
<i>Sweden</i>	9.6
<i>Portugal</i>	9.4
<i>Romania</i>	8.4
<i>France</i>	7.9
<i>Switzerland</i>	7.4
<i>Slovakia</i>	7
<i>Denmark</i>	6.6
<i>Lithuania</i>	6.2
<i>Poland</i>	5.5
<i>Ukraine</i>	2.4

	<b>Grads per 100K population</b>
<i>Slovenia</i>	7.3
<i>UK</i>	6.3
<i>Netherlands</i>	5.8
<i>Czech R</i>	5.3
<i>Portugal</i>	5.3
<i>Spain</i>	5.3
<i>Croatia</i>	4.2
<i>Romania</i>	3.9
<i>Switzerland</i>	3.3
<i>Denmark</i>	3.1
<i>Slovakia</i>	2.5
<i>France</i>	2.3
<i>Italy</i>	2.3
<i>Sweden</i>	2.1
<i>Lithuania</i>	1.9
<i>Poland</i>	1.5
<i>Greece</i>	1.2
<i>Ukraine</i>	0.17

	<b>Grads per 1000 Chemical Industry workforce</b>
<i>Portugal</i>	38.7
<i>Romania</i>	34.2
<i>UK</i>	27.5
<i>Netherlands</i>	17.1
<i>Denmark</i>	16
<i>Spain</i>	12.7
<i>Italy</i>	12.5
<i>Greece</i>	10
<i>France</i>	9.3
<i>Lithuania</i>	8.7
<i>Slovenia</i>	4.8
<i>Czech R</i>	4.2
<i>Sweden</i>	3.9
<i>Switzerland</i>	3.7
<i>Croatia</i>	3
<i>Poland</i>	1.8
<i>Slovakia</i>	1.1
<i>Ukraine</i>	N/A

# ECCE21 Engineering the Future

virtual event

20 - 23 September 2021

<https://ecce-ecab2021.eu>

## ECCE13 & ECAB6 News

20–23 September 2021 (EFCE Event No. 767)

### **Motto: Engineering the Future**

ECCE and ECAB cover the whole range of relevant topics from laboratory research via process development and chemical reaction engineering to challenges from industrial practice and overarching topics such as quality management and education. A virtual poster exhibition with opportunities for discussion, interactive workshops and panel discussions as well as high-ranking plenary presentations complement the scientific program.

### **Submit your poster for ECCE/ECAB until 17 May 2021**

The deadline for the submission of oral presentations has passed, but you are cordially invited to contribute to the scientific programme and submit your Poster until 17 of May 2021. The posters will be **exhibited during the whole duration of ECCE/ECAB2021**. Furthermore, some poster authors will have the opportunity to present their poster during poster flash talks. The posters for the flash talks will be chosen by the scientific committee after 17 May 2021. For further information on the topics please have a look at our conference homepage <https://ecce-ecab2021.eu/>

### **Invitation: Participate with your contribution at Science Slam "Engineering the future"**

You are an expert in your research topic and want to share it with the world, but in a way that gets to everybody? We are looking for inspiring young scientists who want to share their passion, and invite you to join the science slam during ECCE/ECAB 2021. Climb the virtual stage on 22nd of September with the topic "Engineering

the Future" and compete with other researchers. Present the astounding project you love so much and work so hard on in a fun seven-minute presentation! You can either record your slam or perform live during the online session. Prizes of 100 - 300 € await the winning three!

Please apply until **30th of June** by sending an email with your title/topic and affiliation to [ingeborg.heuschkel@basf.com](mailto:ingeborg.heuschkel@basf.com) or [florence.schempp@basf.com](mailto:florence.schempp@basf.com).

We are looking forward to your contributions!

### **Become a sponsor**

ECCE and ECAB offer attractive sponsoring packages for companies and institutions!

### **Exhibition**

We offer the two attractive packages for virtual company booths Present your services and technologies to c. 2,000 expected attendants and use your virtual exhibition booth to reach out to students, young professionals and potential cooperation partners.

### **Book your virtual booth now!**

Further information: <https://ecce-ecab2021.eu/Exhibition.html>

### **Satellite Session**

In addition to the topical programme you are invited to join the following Satellite Sessions organized by our partners:

- **AI in process modelling, design and operation**  
organized by KEEN Project and ProcessNet Subject Division Process and Plant Engineering

- **BioBall – Utilizing Residual Materials in the Metropolitan Area: Closing the Loop**  
organized by BioBall – Bioeconomy in the metropolitan area
- **CAPE Identity Workshop**  
organized by EFCE Working Party on Computer Aided Process Engineering
- **Data Science Approaches in QbD for Pharma 4.0 Solutions\***  
organized by EFCE Working Party on Quality by Design
- **Examples & Showstoppers to implement QbD\***  
organized by EFCE Working Party on Quality by Design
- **Electro-biotechnological processes**  
organized by DECHEMA Working Party Electrobiotechnology
- **Foam formation and management in thermal separations**  
organized by Project cluster on the topic "Foams in process engineering plants"
- **Future Directions in Product Design and Engineering\***  
organized by Erlangen Collaborative Research Centre 1411 on "Design of Particulate Products" and EFCE Section on Product Design and Engineering
- **Immersive Learning and Training for Chemical Engineering**  
organized by CHARMING project
- **Multidimensional particle properties – characterization and processing technology**  
organized by DFG SPP 2045
- **Process Intensification\* (submissions under topic 2.1 Chemical & Bioprocesses)**  
organized by the EFCE Working Party on Process Intensification
- **Processes and Fundamentals of Reactive Multiphase Flows\***  
jointly organized by EFCE Working Party "Multiphase Fluid Flow", ProcessNet Subject Division "Multiphase Flows" and InPROMPT
- **Solutions for the power generation, storage and energy supply of the future**  
organized by Prof. Eberhard Schlücker, University of Erlangen-Nürnberg/D and Prof. Marco Mazzotti, ETH Zürich/CH
- **SPP2170 "InterZell"**  
organized by Prof. Dr.-Ing. Ralf Takors, University of Stuttgart/D
- **Sustainable and healthier food production**  
organized by DIL Deutsches Institut für Lebensmitteltechnik e.V., Quakenbrück/D
- **Sustainable processing – from innovation to commercialization**  
organized by EIT Food. Leuven/B
- **Symposium on Energy and chemical engineering\* (submissions under topic 3.2 Energy)**  
organized by EFCE Section on Energy

**The Registration will be open from the beginning of May.**

**Website:** <http://ecce-ecab2021.eu/>

**Twitter:** #ecceecab21

## EFCE Excellence Awards 2021/2022

EFCE Excellence Awards to recognise a PhD thesis (or papers) published in preceding years, which demonstrate an outstanding contribution to research and/or practice in the respective field. The rules and procedures governing nomination and selection of candidates.

### The following calls for nominations for Excellence Awards 2021 are still open:

- **Excellence Award in Product Design and Engineering 2021**

Closing date for nominations:  
**15 April 2021**

*The Excellence Award is generously sponsored by **Beiersdorf AG**.*

Further information:  
<http://www.efce.info/ExcellenceAwardProductDesign.html>

- **EFCE-EMS Joint Excellence Award in Membrane Engineering**

Closing date for nominations:  
**30 April 2021**

*The Excellence Award is generously sponsored by the **European Membrane Society (EMS)**.*

Further information: <http://www.efce.info/ExcellenceAwardMembraneEngineering>

### Excellence Award 2022

- **EFCE Excellence Award in Fluid Separations 2022**

Closing date for nominations:  
**7 March 2022**

*The Excellence Award is generously sponsored by **Evonik***

Further information:  
<http://www.efce.info/ExcellenceAwardFluidSeparations.html>

## EFCE awards 2021

### Last chance for applications and nominations

#### EFCE Process Intensification Award for Industrial Innovation 2021

The biennial EFCE Process Intensification Award for Industrial Innovation is presented to an employee or a team of employees of a company, who have made excellent contributions to industrial application of process intensification. Please note that the eligibility has been extended to non-European teams.

Closing date for nominations: **30 April 2021**

*The Award is generously sponsored by the **European Process Intensification Centre – EuroPIC**.*

Further information: <https://www.efce.info/PIAwardIndustrialInnovation.html>

#### EFCE Student Mobility Award 2021

The EFCE Student Mobility Award is presented every two years to the best European students of chemical engineering who have studied successfully at least one semester in first or second cycle study programmes in chemical engineering in each of two different countries.

Closing date for applications: **30 April 2021**

*The Award is generously sponsored by the **BASF SE**.*

Further information: [https://www.efce.info/Student\\_Mobility\\_Award.html](https://www.efce.info/Student_Mobility_Award.html)



# Upcoming Webinars

## EFCE Early Career Engineers' Forum

22 APRIL 2021, ONLINE

Young professionals or early career engineers in chemical engineering are confronted with specific challenges ranging from the need to form a professional network to the wish to understand the unwritten rules of the workplace to the desire to identify the opportunities ahead of them. Professional organisations representing chemical engineering are tasked to support their members in these activities. The European Federation of Chemical Engineering (EFCE) will organize an EFCE Forum event, specifically tailored to these subjects. The **EFCE Early Career Engineers' Forum** will feature networking opportunities as well as best practice exchange on activities targeting engineers at the start of their careers.

The event will feature three sessions:

- European Early Career Activities (Plenary Presentation)
- Early Career Round Table Discussion (Workshop)
- Global Perspectives on Sustainability (Workshop)

**Register now free of charge!**

For the detailed programme and the online registration, go to: <http://www.efce.info/EarlyCareerEngineersForum>

## 4th CHISA – De Gryter – EFCE webinar

6 May 2021, 14:00–15:30 CET

**Title: Sustainable Process Engineering: Continuous-flow Reactions and Separations**  
**Speaker: Gyorgy Szekely, King Abdullah University of Science and Technology (KAUST), Thuwal, Kingdom of Saudi Arabia**

Gyorgy Szekely will present sustainable process engineering as a methodology to design new and redesign existing processes that follow the principles of green chemistry and green engineering and highlight his recently published De Gruyter book, "Sustainable Process Engineering" <https://www.degruyter.com/document/doi/10.1515/9783110717136/html>

The CHISA Congress, and the De Gruyter Publishing House, under the auspices of the

European Federation of Chemical Engineering, are commonly hosting a series of free chemical engineering online seminars (webinars). The CHISA Congress, EFCE, DECHEMA, and the De Gruyter Publishing House, are traditional co-operators. In the past years they have brought together many notable speakers to the CHISA congresses audience. Through these webinars we hope to continue this tradition.

**Register free of charge at:** [https://efce.info/CHISA\\_DeGruyter\\_EFCE.html](https://efce.info/CHISA_DeGruyter_EFCE.html)

# EFCE Spotlight Talks

## 5 Webinars

17 - 21 May  
2021

### EFCE SPOTLIGHT TALKS 2021

ONLINE, 17-21 MAY

Welcome to the second series of EFCE Spotlight Talks. There will be a series of talks by seven of our Working Parties: **Chemical Reaction Engineering, Drying, Loss Prevention and Safety Promotion in the Process Industries, Mixing, Multiphase Fluid Flow, Process Intensification, and Thermodynamics and Transport Properties**. We hope you will find the series stimulating and that it will enable you to sample content from some of our groups that you may not otherwise be able to hear.

Date	Topics
17 May 2021	Emerging risks and advanced modelling within the process safety horizon <i>Working Party on Loss Prevention and Safety Promotion in the Process Industries</i>
18 May 2021	Intensification of mixing and multiphase contacting in continuous flow equipment <i>Working Parties on Mixing and Process intensification</i>
18 May 2021	Electrolyte Thermodynamics challenges from industrial needs to academic research <i>Working Party on Thermodynamic and Transport Properties</i> <b>sponsored by IFPEN/ElETher</b>
20 May 2021	Recent Developments and Further Demands in Reactive Gas-Liquid Flows <i>Working Parties on Multiphase Fluid Flow and Chemical Reaction Engineering</i>
21 May 2021	Drying research: focus on freeze-drying, lyophilization, spray-drying and product quality <i>Working Party on Drying</i>

For the detailed programmes of the Spotlight Talks and Registration, please visit the EFCE website at: [https://efce.info/Spotlight\\_Talks.html](https://efce.info/Spotlight_Talks.html)

## Alternative food technologies – Science meets industry

Online, 25, 26 and 27 May 2021, 14:30/15:00 – 18:00 (CET)

**Organizer: EFCE Section on Food**  
**Language: English**

The event will highlight recent activities in research and innovation of selected alternative food processing technologies, as well as reflect on industrial aspects of these technologies. The event provides a chance for academic and industry professionals to discuss recent trends and progress in the area of alternative food technologies.

Each session consists of one scientific lecture giving a brief overview on working principle and fundamentals of the technology, two scientific research reports given by selected PhD Students or fresh Postdocs on the science and industry

relevant research topics (see call for abstracts), and an update from the respective industry representative on research gaps and needs for further and easier implementation of this technology.

The **Call for Papers is open** for 9 specialised sessions in the following fields: Food Safety, Food Quality, Food Technology and engineering issues, Food Sustainability, and any similar theme.

**PhD Students or fresh Postdocs (up to the end of the 2nd year) are invited to submit an abstract for a lecture.**

**Closing date: 19 April 2021**

**Website:** [https://efce.info/Alternative\\_Food\\_Technologies.html](https://efce.info/Alternative_Food_Technologies.html)



# EFCE Bologna Recommendations Update 2020 – Interview with Marko Rogošić

The EFCE Working Party on Education's updated Bologna Recommendations, featured in the February EFCE newsletter, are drawing more attention. A Croatian translation of the text was published in the April issue of *Kemija u industriji*, the official journal of *Croatian Society of Chemical Engineers*. The translation was prepared by Professor Marko Rogošić, a Croatian delegate to the *EFCE Working Party on Thermodynamics and Transport Properties*. We spoke with Professor Rogošić.

## **Q: Why did you decide to translate the EFCE Bologna Recommendations into Croatian and publish them locally?**

A: The community of chemical engineers involved in university-level education in Croatia is rather small. Therefore, the same people are involved in the same things again and again. One of those repetitive things is regular accreditation and re-accreditation of the higher education institutions and the teaching programmes. The original EFCE Recommendations were already taken into account into preparing new chemical engineering programmes at the University of Zagreb in 2005, their version of 2010 was considered as well, and it seemed quite natural to discuss the newest version too. This was particularly important in the light of the soon-to-come accreditation in the second half of 2021. The accreditation documents are always prepared bilingually in Croatia, in Croatian as well as in English, so someone had to translate the Recommendations anyway. And once that you know that you have to do it, it is best to do it at the highest level attainable and to present the result to the public discussion.

## **Q: Who do you think will read the paper?**

A: The subscribers of the *Kemija u Industriji* Journal, published in Croatian for more than 70 years by the Croatian Society of Chemical Engineers (<http://silverstripe.fkit.hr/kui/>), which includes most of the members of the society. Even those who do not get the journal in the paper form could read it online, as it is published in open access. And it is good to mention here that the same society is publishing another open access journal, the *Chemical and Biochemical Engineering Quarterly*, a *Current Contents* indexed journal publishing research papers in English with the tradition of 34 years (<http://silverstripe.fkit.hr/cabeq/>).

## **Q: How do you think they will use the information?**

The teachers of chemical engineering and related programmes in Croatian universities (University of Zagreb, University of Split, Josip Juraj Strossmayer University in Osijek) will no doubt use the translation to check their study programmes vs. the recommendations. Many of them are involved in the committees for preparing the relevant accreditation documents (and most of the Croatian comments added to the original EFCE document deal with the accreditation). The members of the accreditation bodies might find them useful, too. We hope that the people from the industry would read carefully the recommendations and recognize the importance of the industrial traineeships, so they could help the academics in their ongoing efforts in improving the current practice in Croatian universities. Besides industrial traineeships, the major changes are needed in the field of international experience. For example, before Covid-19 approximately 25 % of the students of the graduate study programmes at the Faculty of Chemical Engineering and Technology of the University of Zagreb were involved in international exchange programmes. This was considered good at that time, since all the funding reserved for it at the national level was regularly spent. The increase in financing is therefore required if the figures are expected to increase. Finally, we feel that we have to deal more with digitalization. Covid-19 has already done a lot in enforced digitalization of teaching and introduced the novel and creative ways of student-teacher interaction. However, we have to focus ourselves into introducing students with the recent advances in the chemical process software tools, which are not always available at an affordable price.

We are delighted that Professor Rogošić has taken the time to translate the text. We hope the updated recommendations will enable our colleagues in Croatia to continue to improve and update their study programmes. We also hope they will encourage more companies to offer paid internships to students, which are an invaluable part of the learning experience and of preparing students for a future working environment.

The 2020 Bologna Recommendations document can be found at [https://efce.info/Scientific+groups/Education/Publications/\\_/EFCE\\_Bologna\\_Recommendations\\_2020.pdf](https://efce.info/Scientific+groups/Education/Publications/_/EFCE_Bologna_Recommendations_2020.pdf)

# News from the European Safety Centre – EPSC

## EPSC Learning Sheets

Each month the **European Process Safety Centre (EPSC)** issues a Learning Sheet. These are meant to stimulate discussion on important process safety topics at operational sites and to improve competency & awareness.

All Learning Sheets are available in many different languages.

The April Learning Sheet is about the hazards of [venting hydrogen](#). They have a high tendency to be ignited and need additional attention, as learnt from this specific incident.

Further information:  
<https://epsc.be/Learning+Sheets.html>

### Hydrogen Vents

EPSC Learning Sheet April 2021

**What Happened:**  
Hydrogen was released by a PSV and ignited, causing damages. The initially installed vent line was dismantled after being folded by high reaction forces during a former release. It was decided to wait until the next turnaround to repair the vent line.

**Relevant Process Safety Fundamental**  
Report deficiencies of safety critical equipment

**Aspects:**  
➤ Expect hydrogen to ignite during process vents due to atmospheric electrical effects or charged dust particles.

## EPSC Process Safety Fundamentals

[EPSC Process Safety Fundamentals](#) are a set of basic principles intended to support frontline workers, supervisors and operational management. They draw attention to situations that could lead to a release of a hazardous chemical with potential for severe consequences and emphasize existing good practices to prevent such events.

These process safety fundamentals are [available](#) - in many different languages – in booklet format (pdf) as well as in powerpoint format on the EPSC website at: <https://epsc.be>.

EPSC Process Safety Fundamentals			
Double Isolation	First Line Break	Flexible Hoses	Plugged Equipment
Open Drain	Operating Limits	Overrides	Reporting
Run Away Reaction	Splash Loading	Line of Fire	Utility Connections
Furnace Burners	Leak Tightness	Unloading	Critical Equipment
Walk the Line	Working behind a Single valve		



## News about the official EFCE journals

### Read journal papers for free

The following articles / issues are set for free access periods. In addition to these, articles that are published via the open access route in the journal are also freely available to all. These are identified in ScienceDirect by a green dot. It is possible sign up to an RSS alert specifically to inform when a new open access article is published in the journal – see individual journal pages to set this up.

**NEW – for the latest updates on published papers, freely available content and editor and author interviews please follow *Chemical Engineering Research and Design* on Twitter @ChemEngResDes**

### *Chemical Engineering Research and Design*

<https://www.sciencedirect.com/journal/chemical-engineering-research-and-design>

Freely available content:

- **NEW Special Issue** – Special Issue on 60 Years of the Loeb-Sourirajan Membrane: From Fundamental Research to Industrial Application  
<https://www.sciencedirect.com/journal/chemical-engineering-research-and-design/special-issue/10C25KFJTCK>
- January 2021 issue (Volume 165) (Available for free until the end of 2021)  
<https://www.sciencedirect.com/journal/chemical-engineering-research-and-design/vol/165/suppl/C>

### *Process Safety and Environmental Protection*

<https://www.sciencedirect.com/journal/process-safety-and-environmental-protection>

Freely available content:

- January 2021 issue (Volume 145)  
<https://www.sciencedirect.com/journal/>

[process-safety-and-environmental-protection/vol/145/suppl/C](https://www.sciencedirect.com/journal/process-safety-and-environmental-protection/vol/145/suppl/C)

### *Food and Bioproducts Processing*

<https://www.sciencedirect.com/journal/food-and-bioproducts-processing>

Freely available content:

- January 2021 issue (Volume 125)  
<https://www.sciencedirect.com/journal/food-and-bioproducts-processing/vol/125/suppl/C>

### *Education for Chemical Engineers*

<https://www.sciencedirect.com/journal/education-for-chemical-engineers>

Freely available content:

- January 2021 issue (Volume 35)  
<https://www.sciencedirect.com/journal/education-for-chemical-engineers/vol/34/suppl/C>

### *Sustainable Production and Consumption*

<https://www.sciencedirect.com/journal/sustainable-production-and-consumption>

Freely available content:

- January 2021 issue (Volume 25)  
<https://www.sciencedirect.com/journal/sustainable-production-and-consumption/vol/25/suppl/C>

### Invitation to submit papers

We have a number of special issues planned that are currently open for submission. Submissions from all welcome! If you require any further information then please contact Managing Editor Catherine Cliffe [ccliffe@icheme.org](mailto:ccliffe@icheme.org)

Details as follows:

## **Chemical Engineering Research and Design**

**Special issue:** Recent Advances in Continuous Crystallization (Manuscript submission deadline **30 June 2021**)

<https://www.journals.elsevier.com/chemical-engineering-research-and-design/call-for-papers/special-issue-recent-advances-in-continuous-crystallization>

## **Process Safety and Environmental Protection**

**Special issue:** Safety, environmental and risk management related to Covid-19 (Manuscript submission deadline **30 June 2021**)

<https://www.journals.elsevier.com/process-safety-and-environmental-protection/call-for-papers/safety-environmental-and-risk-management-related-to-covid-19>

**Special issue:** Data Analytics in Process Safety (Manuscript submission deadline **30 June 2021**)

<https://www.journals.elsevier.com/process-safety-and-environmental-protection/call-for-papers/special-issue-data-analytics-in-process-safety>

## **Sustainable Production and Consumption**

**Special issue:** Strategies for Resilient and Sustainable Supply Chains in an Uncertain Business Environment (Manuscript submission deadline **30 April 2021**)

<https://www.journals.elsevier.com/sustainable-production-and-consumption/call-for-papers/strategies-for-resilient-and-sustainable-supply-chains>

**Special issue:** International Trade and Climate Change (Manuscript submission deadline **10 June 2021**)

<https://www.journals.elsevier.com/sustainable-production-and-consumption/call-for-papers/international-trade-and-climate-change>

**Special issue:** Sustainable Production and Consumption of Non-durable Goods in the Era of Industry 4.0 (Manuscript submission deadline **30 June 2021**)

<https://www.journals.elsevier.com/sustainable-production-and-consumption/call-for-papers/sustainable-production-and-consumption-spc>

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# **Events organised by or on behalf of EFCE in 2021/22**

An extended list of events is available at <http://www.efce.info/events.html>

## **ESCAPE-31 – 31st European Symposium on Computer Aided Process Engineering Istanbul, Turkey, 6-9 June 2021 (EFCE Event No. 776)**

ESCAPE-31 event is organized under the auspices of the EFCE Working Party on Computer Aided Process Engineering (CAPE-WP), the Chamber of Chemical Engineers of Turkey (KMO), and Koc University, Istanbul. ESCAPE-31 aims to bring together researchers and practitioners of computer-aided process engineering (CAPE) community and provide a forum to present and evaluate emerging research methods and concepts, and to learn from industrial case studies.

### **Themes:**

(1) Process-product synthesis, design and integration; (2) Methods, models and computational tools for PSE; (3) Process control and operations; (4) CAPE/PSE in energy/water/food nexus and sustainability; (5) Process operations and supply chains; (6) PSE in biological systems and processes; (7) Education in CAPE/PSE & knowledge transfer.

**Plenary speakers:** Marc-Olivier Coppens, University College London; Stratos Pistikopoulos, Texas A&M University; Gintaras V. (Rex) Reklaitis, Purdue University.

**Register NOW!**

**Website:** <https://www.escape31.org/>

## 12th European Symposium on Electrochemical Engineering – ESEE 2021

*Leeuwarden, The Netherlands,  
New date: 13-17 June 2021  
(EFCE Event No. 766)*

**Motto: Electrochemistry for electrification and energy transition toward a sustainable future**

The 12th European Symposium on Electrochemical Engineering - ESEE 2021 is organised by the EFCE Working Party on Electrochemical Engineering in cooperation with Wetsus.

**Topics:** Electrocatalysis and electrochemical technologies; Safe water and air; Corrosion science for durable materials; Water electrolysis and fuel cells; Novel energy storage devices, batteries, and electrochemical capacitors; Bioelectrochemistry for energy conversion and resource recovery; Green capture and conversion of CO<sub>2</sub>; Electrochemical recovery of raw materials; Advanced membranes and electrodes for selective ion removal; General session.

**Invited speakers:** Matthias Wessling; Menachem Elimelech; Martin Z Bazant; Elif Karatay; Geoff Kelsall; Matthew Suss; Manuel Andres Rodrigo; Xiao Su.

On the occasion of the ESEE2021 the EFCE Working Party will present its prestigious **Carl Wagner Medal of Excellence in Electrochemical Engineering.**

### Important information regarding the conference format:

It is hard to estimate how international traveling will be affected in the upcoming months, as a result of the COVID-19 pandemic. We are aware that many presenting authors and attendees might experience several travel restrictions (travel bans or quarantine periods), and might not be able to be physically present in Leeuwarden.

To allow all speakers to present their work and deal with such dynamic situation, the ESEE 2021 conference will be organized as follows:

- **Day 1-2 (Mon 14th – Tue 15th):** HYBRID event: The first two days of ESEE 2021 will be run in a hybrid format, facilitating both on-site and online participation. We encourage all the speakers/attendees that will be able to travel to join us in Leeuwarden. All sessions will be live-streamed, to allow online participation for registered participants
- **Day 3-4 (Wed 16th – Thu 17th):** ONLINE event. The last two days of ESEE 2021 will be run fully online, to allow presenting authors with travel restrictions to present their work.

Please note that, In the case of severe restrictions from the Dutch government, the whole event will be fully held online.

**Register NOW!**

**Website:** <http://www.electrochemical-engineering.eu/2021/>

## 14th Mediterranean Congress of Chemical Engineering - Virtual Session, 6–8 July 2021 (EFCE Event No. 768)

The 14th Mediterranean Congress of Chemical Engineering will be back virtually in July, following the hybrid concept started last November. The Congress will cover all aspects and results related to Chemical Engineering, to its application in areas as Sustainable Development and Environmental Engineering, Food and Biochemical Engineering, Process and Product Engineering, and classic areas as Separation Technologies, Chemical Reactors, and Processes. A unique opportunity to exploit new synergies!

**Abstract Submission is now opened!**

**Website:** <https://www.mecce.org/>

## 21st International Symposium on Industrial Crystallization-ISIC 21 Virtual, 30 August–2 September 2021 (EFCE Event No. 751)

The symposium is organised under the auspices of the EFCE's Working Party on Crystallization and, has become the premier international conference in the field of industrial crystallization. The 21st ISIC provides a meeting and a discussion forum for scientists and engineers from academia and industry as well as suppliers of crystallization and related analytical equipment. The conference program will include lectures and poster sessions. A concomitant exhibition and introductory tutorials will complete the event.

**Main Topics:** Fundamentals of crystallization; Crystallization and precipitation in fine chemical, specialty & life-science industries; Developments in large scale industrial crystallization; Contributions of crystallization to sustainability; Integrated process design: Crystallization in the industrial process chain.

**Plenary and Evening speakers:** Prof. Beatrice Biscans, France; Prof. Richard Braatz, USA; Prof. Helmut Cölfen, Germany; Prof. Juanma Garcia-Ruiz, Spain; Dr. Daniel Green, USA; Dipl.-Ing. Christian Melches, Germany.

**Register NOW! Deadline for early-bird registration deadline: 15 June 2021**

**Website:** [https://dechema.de/en/ISIC\\_2021](https://dechema.de/en/ISIC_2021)

## **XXIV International Conference on Chemical Reactors – CHEMREACTOR-24** **12–17 September 2021** **(EFCE Event No. 769)**

The XXIV International Conference on Chemical Reactors – CHEMREACTOR-24 is organised by the Boreskov Institute of Catalysis, Russia jointly with the world famous Politecnico di Milano, Italy.

**The final decision on the format of the event will be made in April (in-person/online/hybrid).**

**Main topics:** Advances in Chemical Reactor Fundamentals; Chemical Reaction Engineering and Reactor Design – Novel Experimental Approaches, Modeling, Scale-Up and Optimisation; Chemical Reactors and Technologies for Targeted Applications; Advanced Processing of Conventional and Unconventional Hydrocarbon Feedstocks.

**Plenary speakers:** Prof. Guy Marin; Prof. Annemie Bogaerts; Prof. Ib Chorkendorff; Prof. Fausto Gallucci; Prof. Freek Kapteijn; Dr. Carlo Perego.

**Register NOW!**

**Website:** <http://conf.nsc.ru/CR-24/en/>

## **14th Mediterranean Congress of Chemical Engineering–MeCCE14** **Face-to-Face event, Barcelona, Spain,** **14-17 September 2021** **(EFCE Event No. 768)**

**In conjunction with with EXPOQUIMIA**

**Business program:** Access to the seminar about “How to move from academic research into innovation. Opportunity to participate in mentoring meetings. Full access to Expoquimia Exhibition Area.

**Student program:** Guided Tour to Expoquimia Exhibition / Access to seminars about Circular economy and Digitalization and opportunity to present your final project degree at the Tech transfer area.

**Detailed information is available at the MeCCE webpage at:** <https://www.mecce.org/>

## **Save the date!**

### **ESCAPE-32 – 32nd European Symposium on Computer Aided Process Engineering** **Toulouse, France, 12-15 June 2022 (EFCE Event No. 778)**

ESCAPE-32 is organised by INP Toulouse in co-operation with the EFCE Working Party on Computer Aided Process Engineering.

**Website:** coming soon

### **ECCE13 & ECAB6– 13th European Congress of Chemical Engineering & 6th European Congress on Applied Biotechnology**

**Online, 20–23 September 2021**  
**(EFCE Event No. 767)**

**Motto: Engineering the Future**

See ECCE13 & ECAB6 news above

**Website:** <http://ecce-ecab2021.eu/>

**Twitter:** #ecceecab21

### **Electrostatics 2022** **Wroclaw, Poland,** **New date: 28 March – 1 April 2022** **(EFCE Event No. 774)**

Electrostatics 2021 has become Electrostatics 2022. The Conference is organised by the Wroclaw University of Science and Technology in co-operation with the EFCE Working Party on Static Electricity in Industry.

Electrostatics 2022 provides a unique interdisciplinary forum for discussion about the electrostatic phenomena and its industrial applications. Fundamentals, hazards, applications, measuring techniques, standards and other related topics are within the scope of the conference.

**Topics:**

1. Applications and Industry; 2. ESD; 3. Fundamentals; 4. Hazards; 5. Liquids; 6. Solid and Powders; 7. Gases; 8. Measuring Techniques; 9. Standards; 10. History of Electrostatics.

**All steps of the conference have been started again.** Please check the conference website for details.

**Website:** <http://www.electrostatics2021.pwr.edu.pl/wp/>

## Save the date!

### **Distillation & Absorption 2022** *Toulouse, France,* **18–21 September 2022** **(EFCE Event No. 780)**

The international conference Distillation & Absorption 2022, last held in Firenze in 2018, will showcase the newest and best in distillation & absorption technology and will cover a broad range of fundamental and applied aspects. The conference series is the main international forum for research, development, standards and applications related to this domain, and will bring together industry, academic researchers and students to share and discuss the latest developments in the field. The conference is supported by the Société Française de Génie des Procédés (SFGP) working closely with the EFCE Working Party on Fluid Separation (<http://efce.info/Fluid+Separations.html>).

**Topics:** Basic data; Modelling, Simulation, IA methods (hybrid modelling, digital twin,...); Hybrid and Multifunctional Processes (modularity, flexibility, intensification,...); Equipment design, technology and innovation (additive manufacturing, centrifugal separation,...); Control, Process operation and troubleshooting; Energy and sustainability in separation processes (efficiency, renewable energy, new concepts, CO<sub>2</sub> capture,...); Biobased separation processes; Mobile/On-board separation processes (embedded processes in cars, ships, aircrafts, satellites); CO<sub>2</sub> capture.

**The call for papers will open in June 2021.**

**Website:** [www.da2022.org](http://www.da2022.org)

### **ACHEMA 2022**

#### **Frankfurt am Main, Germany,** **New date: 4-8 April 2022** **(EFCE Event No. 775)**

Feel the heartbeat of our industry! The process industry is the innovation driver of the world economy and the pacemaker for numerous industrial sectors

Practically all global value chains profit in one way or another from the achievements of chemistry, biotechnology and process engineering. ACHEMA is the central arena of the process industry. Take this opportunity to forge new contacts, to build up business relations and find solutions for your current projects!

At the ACHEMA Congress, researchers, developers and users get together to discuss what's needed, what's possible and what will be the next big thing in the process industries.

**Website:** <https://www.achema.de/en/>

### **17th International Symposium on Loss Prevention and Safety Promotion in the Process Industries – Loss Prevention 2022**

**Prague, Czech Republic, 5–8 June 2022 (EFCE Event No. 765)**

The 17th International Symposium on Loss Prevention and Safety Promotion in the Process Industries and accompanying exhibition is organised by the Faculty of Safety Engineering - VSB Technical University of Ostrava and the EFCE Working Party on Loss Prevention.

**Topics:** The topic matrix is available at: <https://on-line-form.eu/lossprevention2022/abstracts/index.php?coo=1>

The call for papers is open. Abstract submission deadline: **15 May 2021**

**Website:** <http://www.lossprevention2022.org>

### **17th European Conference on Mixing (EFCE Event No. 773)**

The Mixing Conference is organised by the University of Porto on behalf of the EFCE Working Party on Mixing. **The physical conference in Porto, Portugal is postponed to 2023.**

**Website:** <http://mixing17.eu/>

## Contact

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