(Project Number: 945301)

DELIVERABLE D3.8

Status description of NucWik

Lead Beneficiary: CEFAS

Due date: 30/09/2023 Released on: 29/10/2023

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Start date of project: **01/10/2020** Duration: **36 Months**
Project Coordinator: Assoc. Prof Mojmír Němec
Project Coordinator Organisation: CTU VERSION: 1.5

Project co-funded by the European Commission under the Euratom Research and Training Programme on Nuclear Energy within the Horizon 2020 Programme		
Dissemination Level		
PU	Public	**X**
RE	Restricted to a group specified by the Beneficiaries of the A-CINCH project	
CO	Confidential, only for Beneficiaries of the A-CINCH project	

Version control table

Version number	Date of issue	Author(s)	Brief description of changes made
1.0	24th Oct. 2023	Jon Petter Omtvedt	Initial draft – history and status of NucWik
1.1	26th Oct. 2023	Jon Petter Omtvedt	Added screen shots
1.2	29/10/2023	Nick Owens	Second version
1.3	02/11/2023	Elena Macerata	WP leader check and approval
1.4	02/11/2023	Jana Peroutková	MST check
1.5	16/11/2023	Mojmír Němec	Coordinator's check and approval

Project information

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Acronym:	A-CINCH
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Coordinator:	Mojmír Němec
EC Project Officer:	Kateřina Ptáčková
Start date – End date:	01/10/2020 – 30/09/2023 i.e. 36 months
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"This project has received funding from the Euratom research and training programme 2019-2020 under grant agreement No 945301."

EXECUTIVE SUMMARY

NucWik had been developed over the course of all four CINCH projects to be a Wiki-based resource for teachers and students of radio- and nuclear chemistry. It is now hosted on a site run by CTU where it is now available to all (https://nucwik.cinch-project.eu/). The content has been checked and is now certified by the CINCH project to be of sufficiently high standard to be publicly available. NucWik has the potential to have more material added to it future years to keep it up-to-date with current trends in teaching and learning.

Contributors to the NucWik work in the current project (A-CINCH) and reported on in this Deliverable are:

- Jon Petter Omtvedt (UiO)
- Deniz Avsar (UiO)
- Olga N. Salina (UiO)
- Nick Evans
- Susanna Salminen-Paatero (UH)
- Gareth Law (UH).

CONTENT

1 NUCWIK HISTORY AND BACKGROUND

This chapter have mostly been copied from the MEET-CINCH Deliverable 7.3, but updated with changes added in the current A-CINCH project work reported on here. By doing this the current document contains a complete history of the NucWik site and work, without need to go through several generations of documents.

Early in the CINCH-project series an idea was developed to provide a website for sharing and distributing material for teaching nuclear and radiochemistry. The idea was that this should be an open and freely available site where teaching material could be collected and organised in a logical and easy to find way. Furthermore, it should provide a platform where it was easy for teachers from anywhere to collaborate on developing and creating new or enhanced material. For this reason, a wiki-platform was selected as it should be an ideal tool for achieving document sharing and co-development between users without interference from a top-level management. The platform was planned to be user managed and driven by teachers benefitting from collaboration with other teachers across institutional and national borders.

What is a wiki site?

A wiki is a hypertext publication collaboratively edited and managed by its own audience directly using a web browser. A typical wiki contains multiple pages for the subjects or scope of the project and may be either open to the public or limited to use within an organization for maintaining its internal knowledge base.

Wikis are enabled by wiki software, otherwise known as wiki engines. A wiki engine, being a form of a content management system, differs from other web-based systems such as blog software, in that the content is created without any defined owner or leader, and wikis have little inherent structure, allowing structure to emerge according to the needs of the users. Wiki engines usually allow content to be written using a simplified markup language and sometimes edited with the help of a rich-text editor. There are dozens of different wiki engines in use, both standalone and part of other software.

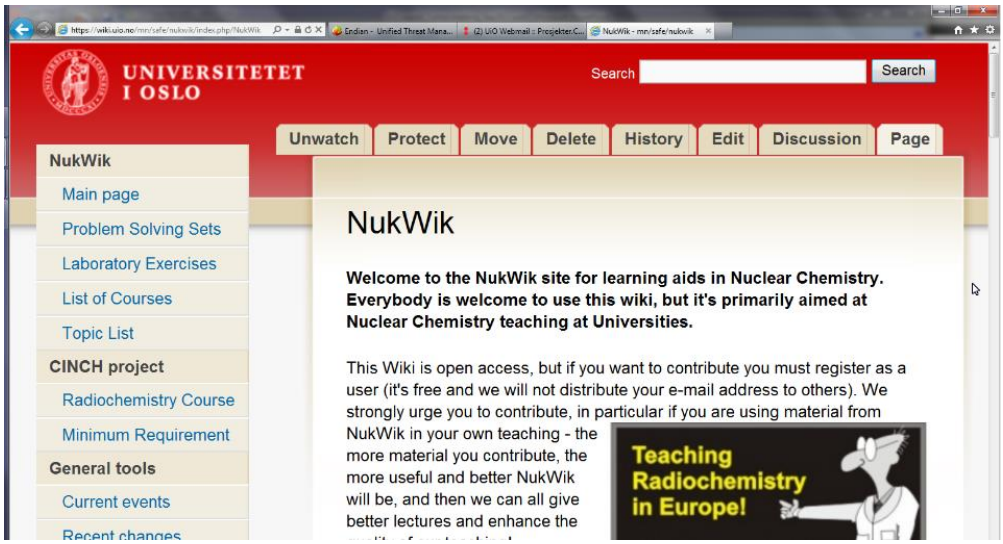
Source: Wikipedia.org

The task description (for the first CINCH project – CINCH) was:

Task 5.3 Setting up and implementing an interactive database of teaching material and aids

A suitable interactive database must be identified, most probable in the form of a wiki. A reliable service provider for the database must be found, preferentially free of charge (a university, most likely). The database structure and organisation will be established and initial material (from Task 5.1, the other WPs and other sources) entered into the database. Integration with the e learning platform must be tested and verified, and guidelines developed and written. Questions related to IPR will be evaluated.

As a result of this task the first NucWik – **Nuc**lear and Radiochemistry Teaching Material **Wik**i - was run on servers provided by UiO and was one of the Deliverables from CINCH. Its Norwegian origin was recognised in that NucWik actually was spelt with a "k" and not a "c" – NukWik. Here is how it looked:



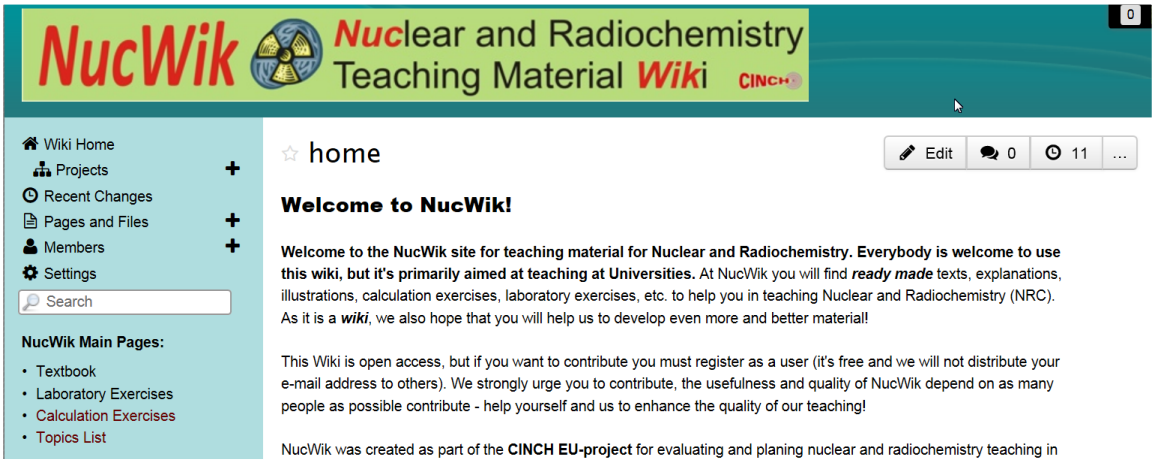
Three Deliverables about NucWik (or NukWik) came from CINCH:

D5.4: Up and running interactive database providing teaching material and aids for nuclear chemistry;

D5.5: Description of and user manual for the database;

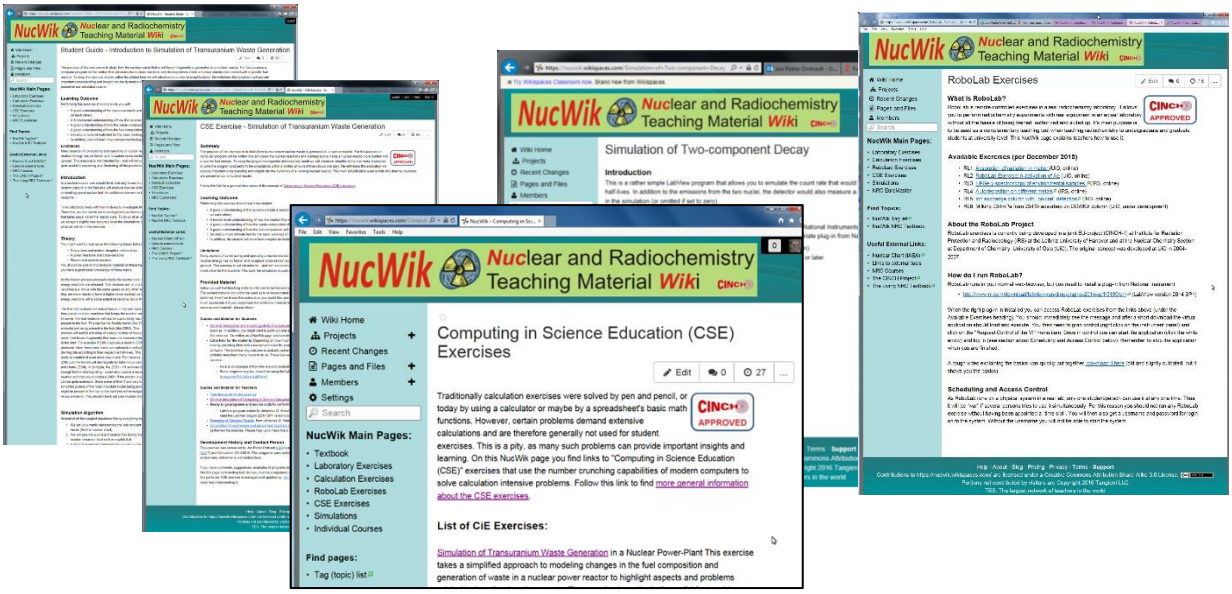
D5.6: Evaluation of how teachers and students experience working with the interactive database.

The main conclusion was that it seemed as a very useful tool, but access to it for none-UiO users was too difficult. Therefore, in the next CINCH project – CINCH-II – it was decided to move it to a new platform. This constituted Task 3.1 and Deliverable 3.3: "Wiki for sharing and developing teaching material established" (June 2014). The commercial wikispaces.com service was selected to host the new NucWik. This time, NucWik was spelt properly – with a "c". The new site looked like this:



All material from the old UiO wiki-site was transferred to the new site and new material was added. During this project it became more and more clear that to entice teachers to actively contribute was

very difficult and few pages was actually the result of active collaboration. Instead most of the material had been uploaded by the creators – teachers from the CINCH collaboration – and was mostly copy and paste from laboratory manuals and other material thought to be worth sharing. Nevertheless, NucWik under CINCH-II evolved into a comprehensive database of teaching material for Nuclear and Radiochemistry.



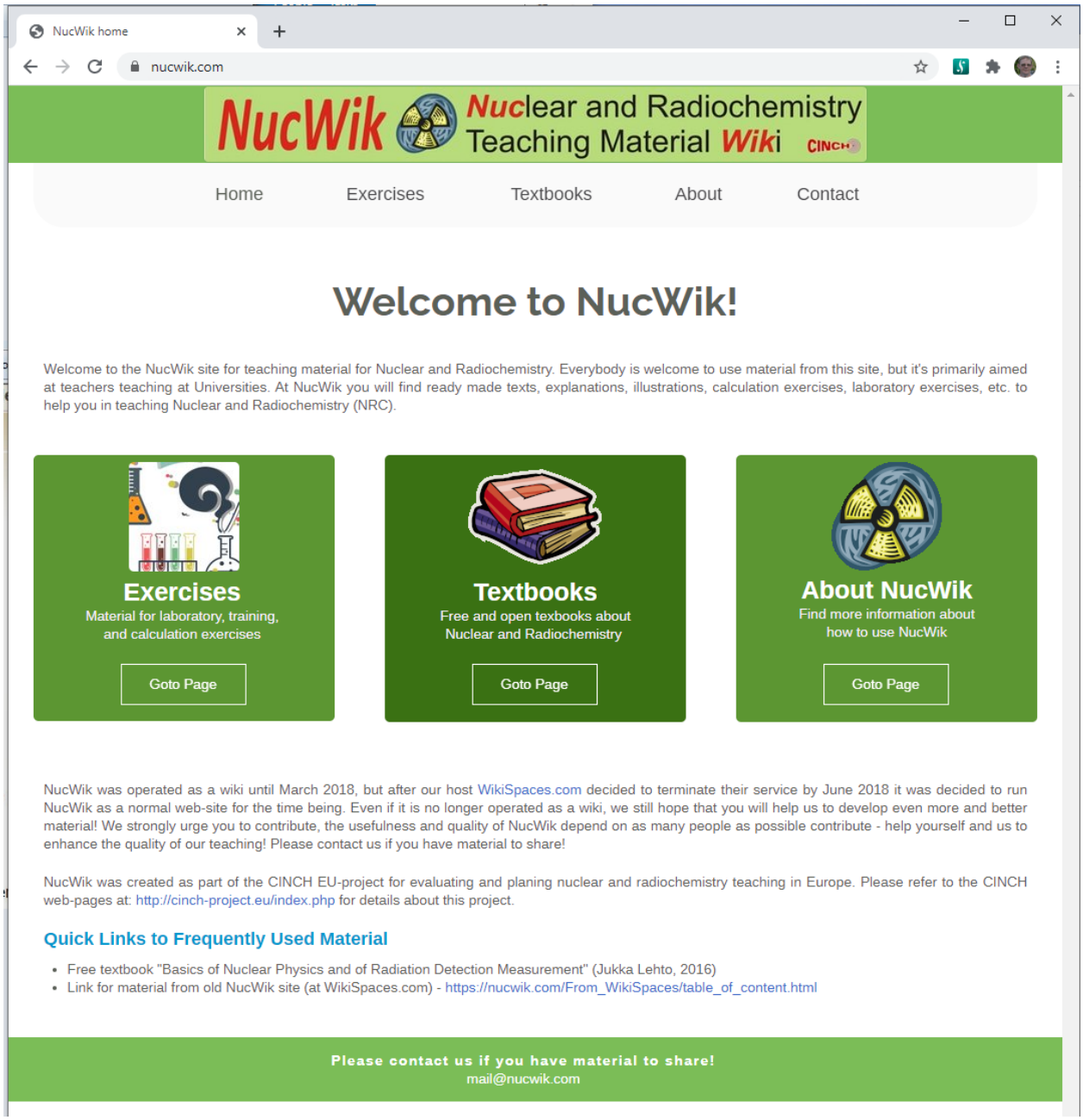
Part of the work in CINCH-II was to write a textbook "Basics of Nuclear Physics and of Radiation Detection and Measurement" which should be an open-access textbook for nuclear and radiochemistry students. The book was written by Jukka Lehto (Univ. of Helsinki) in 2015 and converted to the EPUB format and made available from NucWik in 2016, at the end of the CINCH-II project.

For the third CINCH project – MEET CINCH – UiO unexpectedly did not get funding and was initially left out. Nevertheless, the UiO crew maintained the NucWik database on Wikispaces.com to ensure that material was not lost and that it could be continued to be one of the major platforms used by the CINCH consortium. However, in 2018 WikiSpaces.com was shutting down its services, including the NucWik site. It was therefore very important to 1) save the material and 2) transfer it to a new site. This was done by the UiO crew such that no material was lost. Since resources was scarce all content was simply transferred to an ordinary web-site server. However, the structure and formatting provided by the Wiki engine could not be copied and the material now constituted a long list of HTML formatted pages. It was therefore very hard to locate material that previously was easy to find under the logical overlay structure provided by the WikiSpace.com server. The new site is maintained by the commercial service One.com on a strictly commercial basis. Is therefore much less likely to be shut down and the fee is reasonable. The main purpose at this point was to ensure that no material was lost.

Fortunately, UiO was able to join the MEET-CINCH project as an official partner after having received a limited amount of funding for 2019/2020. The main task for UiO was to upgrade the remote control system RoboLab, this is described in Deliverable 7.1 and 7.2 and constituted the major part of the UiO effort and contribution. However, a few PMs were dedicated to "overhaul" the new NucWik site to rebuild the structure and navigation tools needed to easily access the material. This work constituted Deliverable 7.3: " NucWik.com Overhaul ".

for the new site it was decided to develop it as an ordinary web-site instead. A wiki engine can be added at a later stage, but the work and hassle of doing so was not considered worth it unless there are clear indications that teachers actually want to work together in this way. This is a pity, as the concept is quite good – we think – and should have provided a method to reduce the individual burdens of maintaining up-to-date teaching material. However, as everybody really likes to download but mostly contribute very little to the content of the site, the new NucWik is currently set up as a strict content service. From a practical point of view, the available funding would not have been enough to set up a dedicated wiki engine, so this was also a decision based on the available resources for doing the work.

The new site looks like this:



The new NucWik on the one.com commercial site has the domain name nucwik.com and was (and still is), an open access and free site. We plan to discontinue this site from end of 2024, until then the material that was not transferred to the new NucWik site (described in the following chapters) can be found on the old site.

2 THE NEW NUCWIK SITE

As part of collecting all the tools developed under the four CINCH projects on a single site, a new wiki-site was setup on the Czech server site also hosting the CINCH Hub, CINCH Moodle, etc. The address of the new site is:

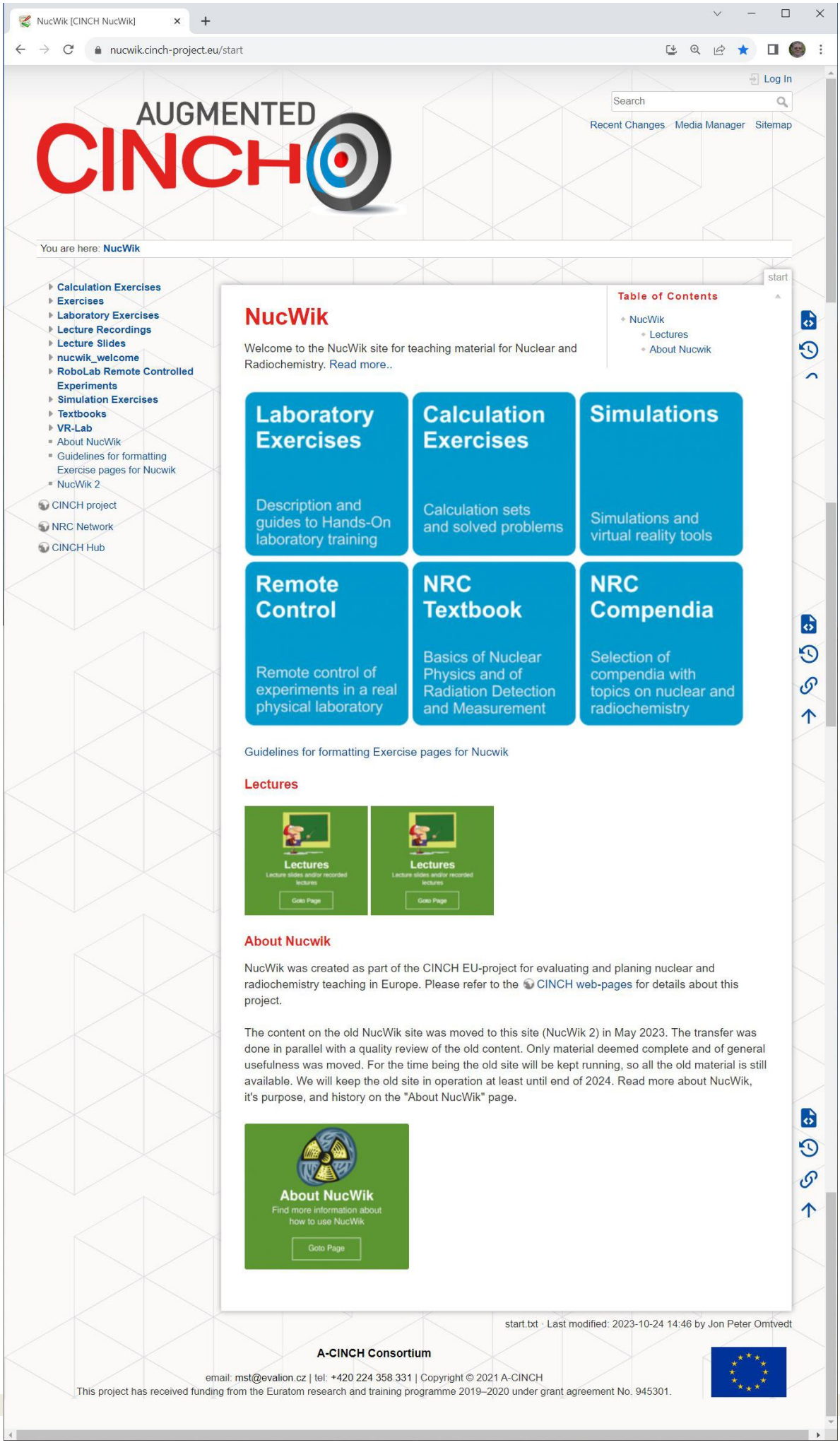
https://nucwik.cinch-project.eu/

The start page is harmonized with the design of the CINCH Hub start page, using the same type of clickable boxes to quickly navigate to the main parts. A screen shot of the start page of the new NucWik wiki is provided on the next page.

As can clearly be seen, the major parts of NucWik are sections where teachers (and students if so inclined) can download prepared teaching material for:

- Calculation exercises;
- Laboratory exercises;
- Simulations and virtual reality "games" relevant to nuclear and radiochemistry;
- Instructions and material for remote controlled laboratory experiments;
- Textbooks and compendia.

The site is also prepared for linking relevant lecture recordings and video materials. However, per October 2023 this part of NucWik does not contain any material. As a wiki-site, we expect material to become available according to how much the wiki is actually used. Furthermore, time permitting, we will link videos produced during the CINCH projects in this part of NucWik. This task is not regarded as part of any A-CINCH Deliverable, but would be convenient for the future.


NucWik [CINCH NucWik]
nucwik.cinch-project.eu/start
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Lecture slides and/or recorded lectures
Goto Page
About Nucwik
NucWik was created as part of the CINCH EU-project for evaluating and planing nuclear and radiochemistry teaching in Europe. Please refer to the CINCH web-pages for details about this project.
The content on the old NucWik site was moved to this site (NucWik 2) in May 2023. The transfer was done in parallel with a quality review of the old content. Only material deemed complete and of general usefulness was moved. For the time being the old site will be kept running, so all the old material is still available. We will keep the old site in operation at least until end of 2024. Read more about NucWik, it's purpose, and history on the "About NucWik" page.
About NucWik
Find more information about how to use NucWik
Goto Page
start.txt · Last modified: 2023-10-24 14:46 by Jon Peter Omtvedt
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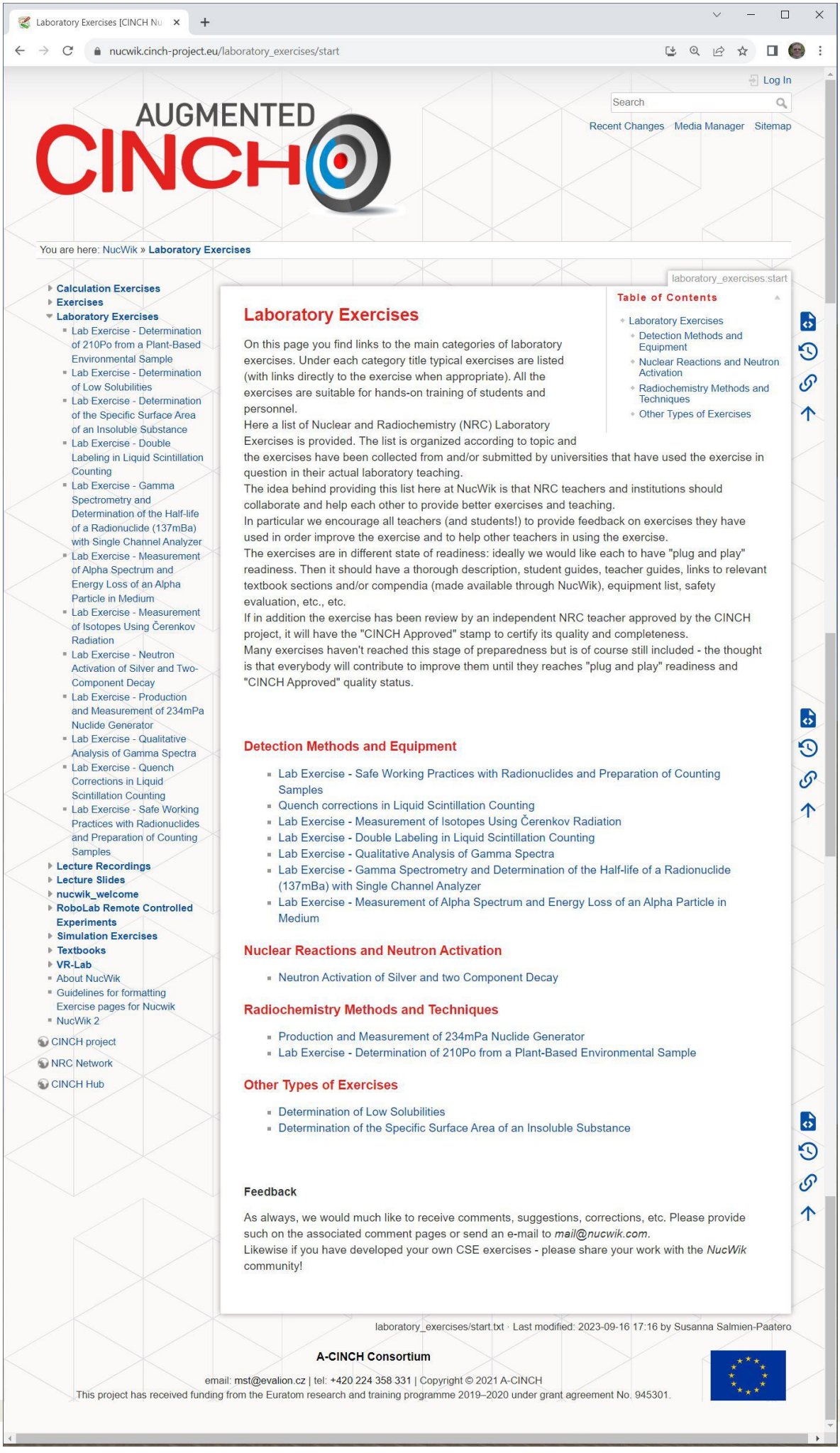
3 SELECTION OF CONTENT TO TRANSFER AND UPLOADED

A complete review of all the content on the previous NucWik site (hosted by the one.com and described in MEET-CINCH Deliverable 7.3) was performed. We then transferred material that was complete enough to be of general use. In addition, quite a lot of material available from the University of Helsinki was added. Screen shots of the various sections, indicating the content that is available, is provided below.


Laboratory Exercises [CINCH Nu
nucwik.cinch-project.eu/laboratory_exercises/start
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Lab Exercise - Determination of Low Solubilities
Lab Exercise - Determination of the Specific Surface Area of an Insoluble Substance
Lab Exercise - Double Labeling in Liquid Scintillation Counting
Lab Exercise - Gamma Spectrometry and Determination of the Half-life of a Radionuclide (137mBa) with Single Channel Analyzer
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Laboratory Exercises
On this page you find links to the main categories of laboratory exercises. Under each category title typical exercises are listed (with links directly to the exercise when appropriate). All the exercises are suitable for hands-on training of students and personnel.
Here a list of Nuclear and Radiochemistry (NRC) Laboratory Exercises is provided. The list is organized according to topic and the exercises have been collected from and/or submitted by universities that have used the exercise in question in their actual laboratory teaching.
The idea behind providing this list here at NucWik is that NRC teachers and institutions should collaborate and help each other to provide better exercises and teaching.
In particular we encourage all teachers (and students!) to provide feedback on exercises they have used in order improve the exercise and to help other teachers in using the exercise.
The exercises are in different state of readiness: ideally we would like each to have "plug and play" readiness. Then it should have a thorough description, student guides, teacher guides, links to relevant textbook sections and/or compendia (made available through NucWik), equipment list, safety evaluation, etc., etc.
If in addition the exercise has been review by an independent NRC teacher approved by the CINCH project, it will have the "CINCH Approved" stamp to certify its quality and completeness.
Many exercises haven't reached this stage of preparedness but is of course still included - the thought is that everybody will contribute to improve them until they reaches "plug and play" readiness and "CINCH Approved" quality status.
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Lab Exercise - Measurement of Isotopes Using Čerenkov Radiation
Lab Exercise - Double Labeling in Liquid Scintillation Counting
Lab Exercise - Qualitative Analysis of Gamma Spectra
Lab Exercise - Gamma Spectrometry and Determination of the Half-life of a Radionuclide (137mBa) with Single Channel Analyzer
Lab Exercise - Measurement of Alpha Spectrum and Energy Loss of an Alpha Particle in Medium
Nuclear Reactions and Neutron Activation
Neutron Activation of Silver and two Component Decay
Radiochemistry Methods and Techniques
Production and Measurement of 234mPa Nuclide Generator
Lab Exercise - Determination of 210Po from a Plant-Based Environmental Sample
Other Types of Exercises
Determination of Low Solubilities
Determination of the Specific Surface Area of an Insoluble Substance
Feedback
As always, we would much like to receive comments, suggestions, corrections, etc. Please provide such on the associated comment pages or send an e-mail to mail@nucwik.com.
Likewise if you have developed your own CSE exercises - please share your work with the NucWik community!
laboratory_exercises/start.txt · Last modified: 2023-09-16 17:16 by Susanna Salmien-Paatero
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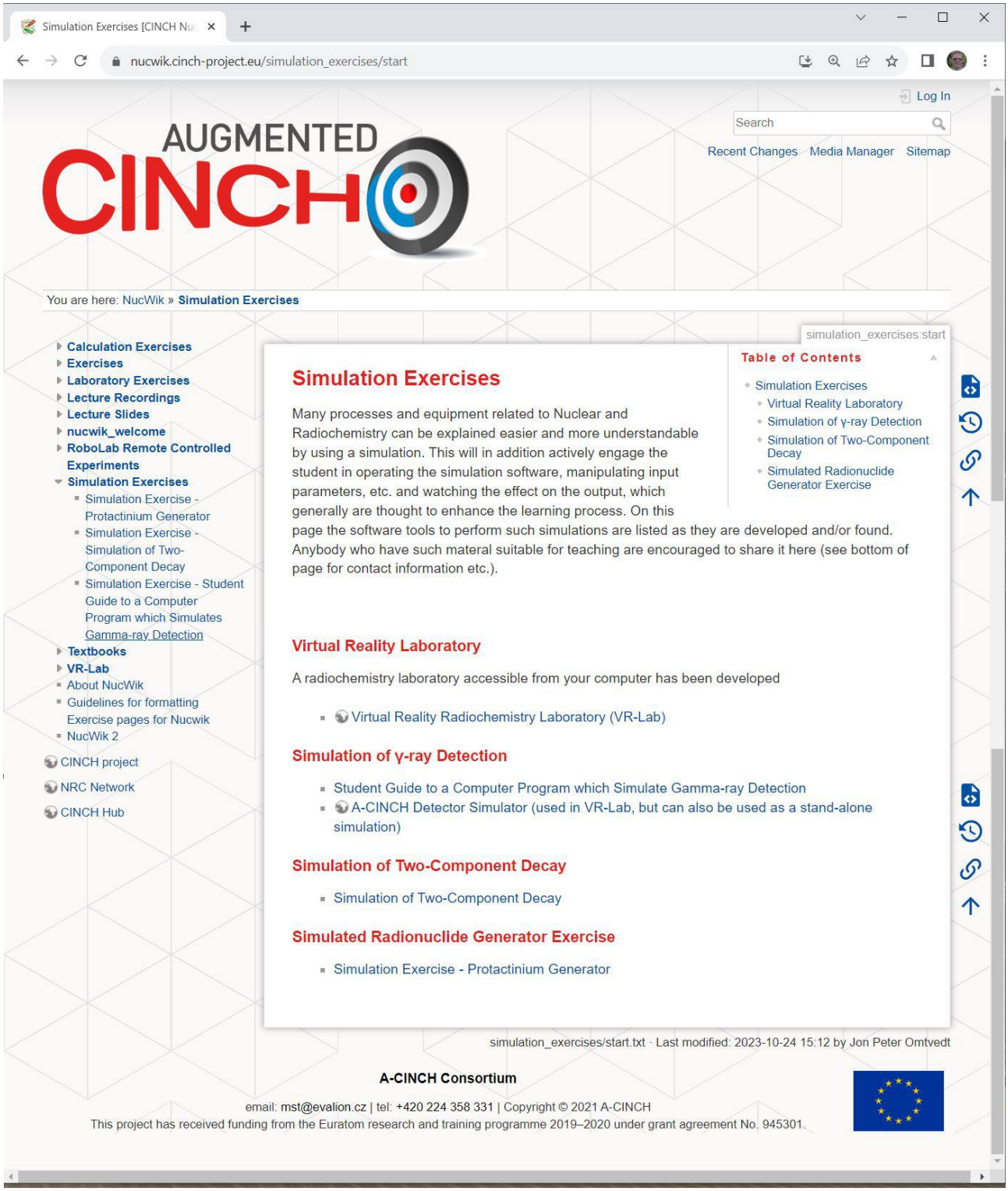
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Simulation Exercises
Many processes and equipment related to Nuclear and Radiochemistry can be explained easier and more understandable by using a simulation. This will in addition actively engage the student in operating the simulation software, manipulating input parameters, etc. and watching the effect on the output, which generally are thought to enhance the learning process. On this page the software tools to perform such simulations are listed as they are developed and/or found. Anybody who have such materal suitable for teaching are encouraged to share it here (see bottom of page for contact information etc.).
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A-CINCH Detector Simulator (used in VR-Lab, but can also be used as a stand-alone simulation)
Simulation of Two-Component Decay
Simulation of Two-Component Decay
Simulated Radionuclide Generator Exercise
Simulation Exercise - Protactinium Generator
simulation_exercises/start.txt · Last modified: 2023-10-24 15:12 by Jon Peter Omtvedt
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RoboLab Remote Controlled Ex

nucwik.cinch-project.eu/remote_control_experiments/start

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remote_control_experiments:start

RoboLab Remote Controlled Experiments

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RoboLab is remote-controlled exercises in a real radiochemistry laboratory. It allows you to perform radiochemistry experiments with real equipment in an actual laboratory without all the hassle of being trained, authorized and suited up. It's main purpose is to be used as a complementary teaching tool when teaching radiochemistry to undergraduate and graduate students at university level. This NucWik page explains teachers how to use it

The RoboLabs are running in a real laboratory. We need to start up the system and prepare the system for remote use before you can use it. Therefore, you need to contact us to arrange a session and agree on the conditions for using the system. You will then get links to clients and instructions on how to perform the experiment. General information, student and teacher guides (if written) are available in the "instructions" links.

- For IRS exercises please contact Vivien Pottgießer (v.pottgiesser[at] irs.uni-hannover.de - contact updated October 2023).
- For UiO exercises please contact Jon Petter Omtvedt (j.p.omtvedt[at]kjemi.uio.no - contact updated October 2023).

Some of the RoboLabs are available as an "Interactive Screen Experiment" (ISE). ISEs are representations of real experiments, where the real experiment is reproduced as accurately as possible by video sequences on the computer screen and stored measurement data. An ISE do not directly use a physical lab and do not require a running RoboLab server, hence it can be used without requiring preparations and manpower at the host site. Access to the IRS versions real RoboLab experiments are available through the "ISE" links below and do not require previous booking.

Available Exercises (per October 2023)

- RL1: Absorption of radiation in matter (UiO) Instructions
- RL2: RoboLab Exercise: n-activation of Ag (UiO) Instructions
- RL3: HPGe γ-spectroscopy of environmental samples (IRS) Instructions ISE
- RL4: Autodeposition on different metals (IRS) Instructions ISE (Not available as remote exercise)
- RL5: Ion exchange column with "on-line" detection (IRS) Instructions ISE (Not available as remote exercise)
- RL6: Separation and detection of 234mPa (UiO) Instructions

About the RoboLab Project

The RoboLab exercises were developed in a joint EU-project (MEET-CINCH and A-CINCH) at Institute for Radiation Protection and Radioecology (IRS) at the Leibniz University of Hanover and at the Nuclear Chemistry Section at Department of Chemistry, University of Oslo (UiO). The original concept was developed at UiO in 2004-2007. Description of RoboLab development in the CINCH-II EU Project: https://www.cinch-project.eu/meet-cinch/fileadmin/user_upload/CINCH-II_Deliverable_3_4.pdf

How do I run RoboLab?

The original RoboLab exercises do not run well in current web browsers and with the much more strict firewalls commonly in use today (October 2023). Some of the RoboLabs was upgraded to use a cloud service and client servers compatible with current day browsers. Others were adopted as ISEs (see above) and some can only be run in makeshift fashion using remote control software or similar. Please reach out to the listed contact persons for information about availability and necessary conditions for running the experiments.

Develop Your Own RoboLab Exercise

LabView is developed using the National Instrument LabView graphical programming language. Please visit the relevant National Instrument web-pages for details about the programming language, e.g. https://www.ni.com/en-no/shop/product/labview.html

At UiO an extensive Template and instructions for setting up the SystemLink cloud service to communicate between user application (client) and physical laboratory (server) was made. This was reported as Deliverable 7.1 under the MEET-CINCH project PDF-file

A number of useful documents were made during the constructions of some of the Robolabs. They are listed below:

- O. N. Salina et al: RoboLab: providing remote access to a physical radiochemistry laboratory for teaching and training volume 332 (2023), page 1533–1539 (https://doi.org/10.1007/s10967-022-08589-3).
- A-CINCH Delivarable 3.6 "Updated LabVIEW version of RoboLabs" (Link will be provided on the A-CINCH project web-site as soon as it is approved)

remote_control_experiments/start.txt · Last modified: 2023-10-03 14:00 by Jon Peter Omtvedt

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4 CONCLUSION AND SUMMARY

NucWik has been developed into a scientifically robust learning resource over the course of CINCH projects. It is a Wiki-based resource for teachers and students of radio- and nuclear chemistry. It is now hosted on a site run by CTU where it is now available to all (https://nucwik.cinch-project.eu/). The content has been checked and is now certified by the A-CINCH project to be of sufficiently high standard to be publicly available. NucWik has the potential to have more material added to it future years to keep it up-to-date with current trends in teaching and learning.