DRD1 WG 8

Training and Dissemination

Elisabetta Baracchini (GSSI, TPC)
Florian Brunbauer (CERN, MPGD)
Mauro Iodice (INFN Roma 3, MPGD)
Barbara Liberti (INFN Roma 2, RPC)
Alessandro Paoloni (INFN LNF, RPC)

DRD1 Collaboration Meeting, February 1, 2024

WG8 Mailing List

https://drd1.web.cern.ch/activities-wg8

Mailing list of DRD1 members interested to participate in and follow WG8 Training and Dissemination activities.

Self-subscribe to WG8 Mailing List for updates, meetings and info:
https://e-groups.cern.ch/e-groups/EgroupsSubscription.do?egroupName=drd1-wg8

Content

- WG8 introduction and scope
  - Interest expressed in DRD1 survey
- Topical workshops
- Supporting and promoting researcher careers
- Education & outreach

- DRD1 Gaseous Detector School

- Technical resources
- Summer student projects
- DRD1 Notes
- Newsletter

WG8 Introduction and Scope

WG8: Training and Dissemination

WG8 aims at facilitating scientific exchanges in the gaseous detector community and educating as well as retaining experts in the field of gaseous detector development.

To this goal, the scope of this working group contains:

- Knowledge exchange and facilitating scientific collaboration
- Training and dissemination initiatives
- Career promotion
- Outreach and education

Following the strong expression of interest to participate, organise training, knowledge sharing and dissemination activities by the gaseous detector community,
WG8 aims at establishing and strengthening communication between members of the collaboration and to promote participation in common activities

Brief Summary of WG8 Survey Results March 2023

Training and Dissemination

Activities your group could be interested in:
(total 69 answers)

- Groups interested in attending training/dissemination
  - 56 schools & training
  - 50 topical workshops
  - 29 knowledge transfer
- Training and dissemination target
  - 47 BsC & MsC
  - 54 PhD
  - 46 Postdocs
  - 28 Seniors

8. Training and dissemination

Training and dissemination Activities your group could be interested in

Answered: 69

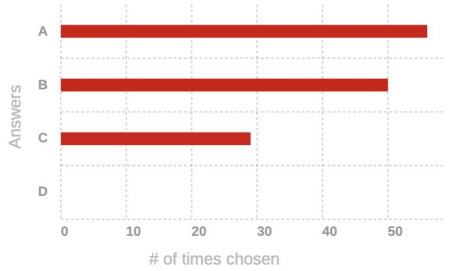
Please select where your team is involved. If not included in the list, please add them.

A. Schools and trainings: 56 (41.48%)

B. Topical workshops: 50 (37.04%)

C. Knowledge transfer: 29 (21.48%)

D. Other: 0 (0.00%)

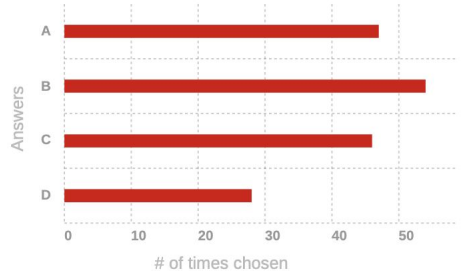


A. Bachelor and Master Students: 47 (26.86%)

B. Doctoral students: 54 (30.86%)

C. Postdoc: 46 (26.29%)

D. Senior: 28 (16.00%)



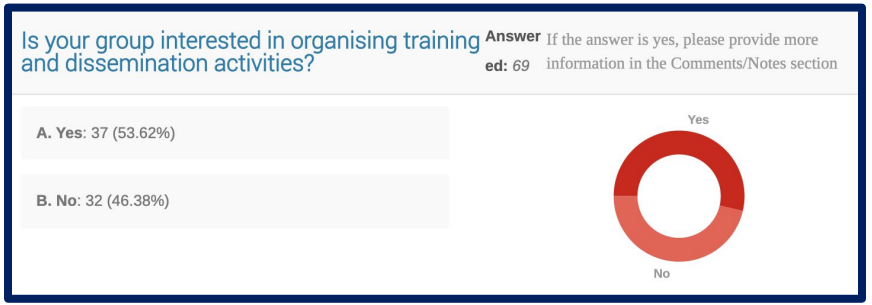
Training and Dissemination - activities

List examples of existing or potential training and dissemination activities that you would like to have in the context of the DRD1 collaborations?

Answers can be grouped addressing the following main categories

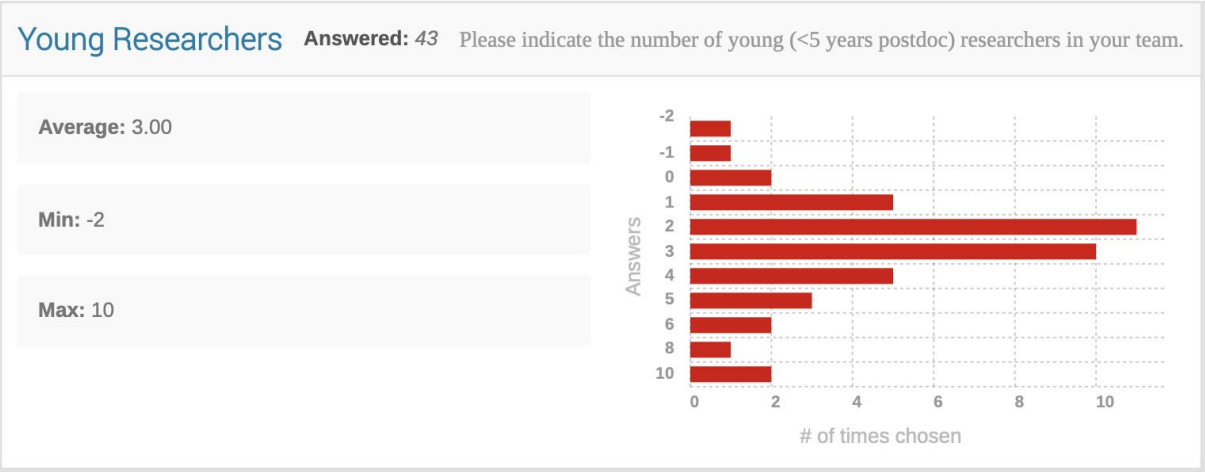
- Detector Schools (several references to existing RD51 initiatives, RPC, SNRI-INFN, …)
  - Topics: Gas detector fundamentals; Assembly; Design; Readout; Gas detector common software/simulation tools; Materials; Gas properties; Ageing; discharges; Data analysis
  - Target: Young, as well as Senior; Training and dissemination are important at any stage of the career
    But also, for public engagement; first-year students → OUTREACH and EDUCATION
- Topical Workshops and Lectures: technology/application/tools (excellent example were the Lectures at CERN in 2019 on signals on particles detectors)
- Training at Labs Institute Facilities
- Visiting Programs

37 groups interested in organising training and dissemination activities



Young Researcher – Current situation

Answers from 43 Institutes



Average current number of young researcher in each group: 2-3

General issue: very difficult to engage young researches, especially in new avenues

Topical Workshops

Topical Workshops

Format

- 1-2 day events in combination with other meetings (e.g. in same week as DRD1 collaboration meetings)
- Stand-alone workshops of several days / week-long
- (Very) specific topics of current community interest

PROPOSAL: Organize 1 day topical workshop coupled to DRD1 meeting in Summer 2024

Possible topics for topical workshops:

- Negative-ion drift (O)TPCs
- Hybrid detectors (gaseous detectors + pixel readout ASICs)
- Alternative gases (green gases, new methods, …)?
- Advanced materials and manufacturing methods
- Resistive materials and detector geometries
- High-performance simulations (GPU, parallel computing, AI, …)
- Signal formation and processing (experimental & simulation)

- … your ideas?

Young Researchers Careers

Strategies to recognize and sustain the careers of R&D experts

Grouping in top survey recommendations

From the WG8 Survey

Proposals of what can be done within DRD1

- Leadership roles within DRD1
- Young (experienced) researcher awards on R&D by DRD1
- Speakers on behalf of DRD1 at International Conferences
- Advertise within DRD1 webpages:
  - Job openings in R&D;
  - experts potentially available for possible jobs/opened positions;
  - availability of training periods in the DRD1 Labs;
  - share of resources (forum to connect people with specific knowledge)
- (Common) Project fundings for young researchers within DRD1
- New career development opportunities through expanded collaborative networks, training events such as summer schools and workshops and DRD1 visiting scientist programs

Strategies to recognize and sustain the careers of R&D experts

Grouping in top survey recommendations

From the WG8 Survey

Proposals that depends on national/institutional/laboratories policies

- PhD thesis fully dedicated to detector developments
- Academic positions for courses on detector developments or for longer term contract
- Correct evaluation of detector-dedicated activities in CVs (i.e., change the mind of funding agencies and University/ Institutions regarding the value of R&D versus analyses)
- Gas detectors activities in University courses
- Trainings on how writing CVs, interviews to valorise experience
- Engaging trainee student in the development of detectors, as they evolve to achieve their undergraduate/diploma/phd degree. It has been found to increase success in getting a position
- Responsibility roles for R&D within collaborations

DRD1 Young Researchers Awards - a concrete proposal

Establish awards to recognise outstanding work of students or young researches in the DRD1 collaboration.

- 2x Awards for presentations given at DRD1 Collaboration Meetings
- 1x Award for exceptional contributions and developments

Starting now, considering contributions in 2024
Nominations & input from WG convenors, selection by small selection committee
Eligibility: students (BSc, MSc, Phd, early-career postdocs up to 3 years after completion of PhD)

A preparatory work is needed starting in the coming weeks, defining:
- the prizes
- the Selection Committee and selection criteria
- advertisements, ….

Education and Outreach

Education

Laboratory activities are crucial part of **physics education** for **young students**.
They help in learning **experimental techniques** and builds teamwork and collaboration skills.
These skills are essential for success in physics and other scientific fields.

- Ensuring **high quality educational Lab activities** focusing on **Gas Detectors** should be among the scopes of DRD1 WG8
    - Share experience (e.g. lab descriptions) , distribute knowledge
    - Schools for students and for teachers
    - Seminars and Tutorials
    - Construction of simple setups /demos – development of portable or closed gas systems

Exploiting the experience gained from the successful RD51 MPGD School, we can explore the option of assembling several dedicated setups for distribution as pilot tests to (interested) university laboratories within the DRD1 Collaboration.

Outreach

Outreach is a crucial tool for attracting students to physics research and ensuring that the field remains diverse and inclusive.

- It must help dispel misconceptions about physics being too difficult or abstract and should demonstrate the practical applications of physics research.
- By providing opportunities for students to learn about and engage with physics research, outreach programs can inspire the next generation of physicists.
- Outreach can also provide opportunities for students to engage with researchers, ask questions, and get hands-on experience with physics concepts and tools

→ Could the CERN Science Gateway serve as an opportunity to initiate outreach activities and share our experience with gaseous detectors? (Establishing a connection with CERN outreach.)

?

Topical workshop during 2024 meetings - topics?

DRD1 Award?

Education / outreach setup?

DRD1 Gaseous Detector School

Previous experience: RD51 MPGD School 2023

https://indico.cern.ch/event/1239595

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00 - 9:00	Registration				
9:00 - 10:00	Introduction: Gas detectors (F. Sauli)	Gas detector physics 2: beyond working point physics (P. Gasik)	Modelling and Simulation 1 (R. Veenhof)	Electronic readout techniques (M. Lupberger)	MPGDs in HEP applications (P. Iengo)
10:00 - 11:00	Gas detector physics 1 (F. Sauli)	MPGD technologies 2: State-of-the-art MPGDs (E. Oliveri)	Modelling and Simulation 2 (P. Verwilligen)	RD51 SRS readout demonstration (M. Lupberger)	Applications beyond HEP: nuclear physics, dark matter searches, neutrino physics (M. Cortesi)
11:00 - 11:30	Break	Break	ATLAS visits	Break	Break
11:30 - 12:30	MPGD technologies 1 (E. Ferrer Ribas)	Manufacturing techniques (R. De Oliveira)		Optical & hybrid readout techniques (D. Pinci)	Applications beyond fundamental research (J. Bortfeldt)
12:30 - 13:00	MPT visit	Group photo + MPT visit	MPT visit	MPT visit	MPT visit
12:30 - 14:00	Lunch break	Lunch break	Lunch break	Lunch break	Lunch break
14:00 - 18:00	Lab session	Lab session	Lab session	Lab session	Lab session
18:00 - 21:00		Student poster session			

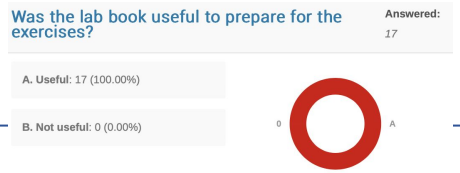
- 5 day school (Nov 27 - Dec 1, 2023) at CERN
- 14 lectures (recorded) + 5 afternoons of lab exercises + visits program + poster session
- 24 students + >50 attendees of lecture program, 25 tutors/lecturers

Previous experience: RD51 MPGD School 2023

https://indico.cern.ch/event/1239595

- Poster session
- Visit program during school (ATLAS, MPT workshop)
- Presentations on student experiences in RD51 Collaboration Meeting

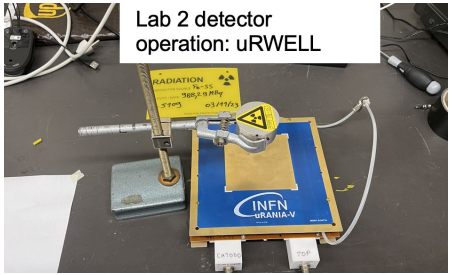
Lab exercises

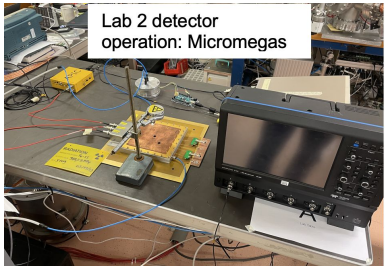


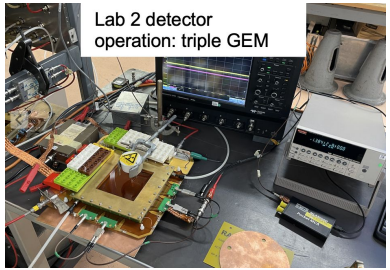
- Experience from RD51 MPGD School:
  - 5 labs, some overlap between operation/characterisation labs
  - Additional time required from e.g. simulation lab (possible also preparatory work before event)
  - Positive feedback from students on length, scope, relevance
- Lab book: https://indico.cern.ch/event/1239595/attachments/2600086/4803190/LabBook-RD51MPGDSchool.pdf

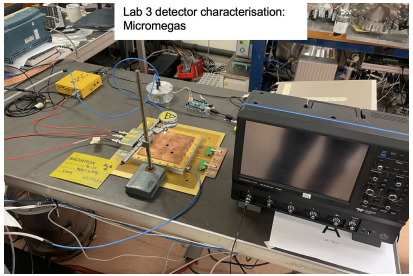
Lab 1 Detector assembly	Lab 2 Detector operation	Lab 3 Detector characterisation	Lab 4 Readout techniques	Lab 5 Detector simulations
Survey of different MPGD technologies with microscope, electrical testing of amplification structures, assembly of detector stack	Familiarity with typical lab instrumentation, gas systems, HV supplies, readout chains, signal shapes, basic operation and readout	In-depth detector characterisation, voltage scans of drift/transfer/amplification fields, effect of change of operating conditions	Electronic and optical readout techniques, e.g. tracking, imaging, basic reconstruction	Introduction to Garfield++ based simulation, basic modelling, electric field map, microscopic tracking

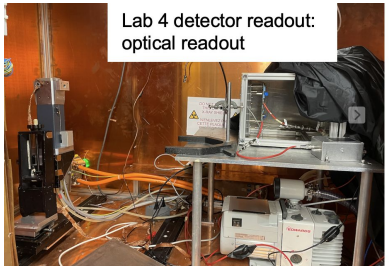
Lab exercises

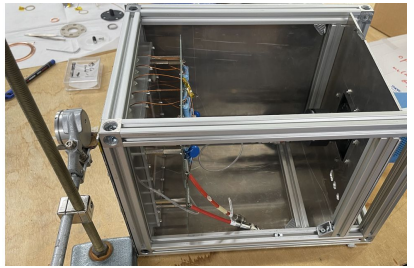


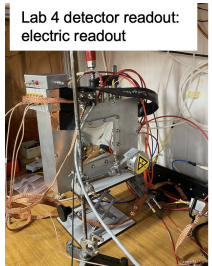


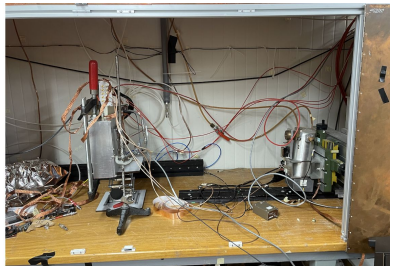




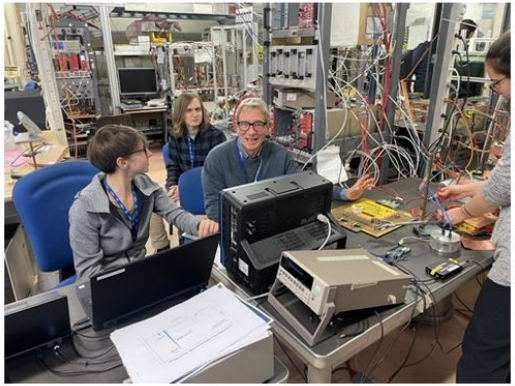


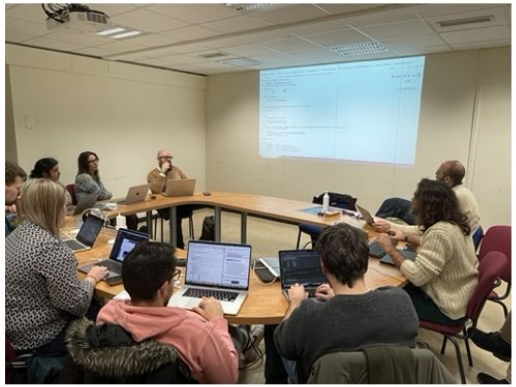
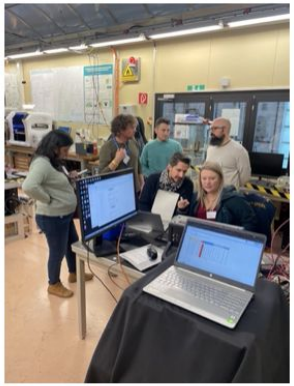


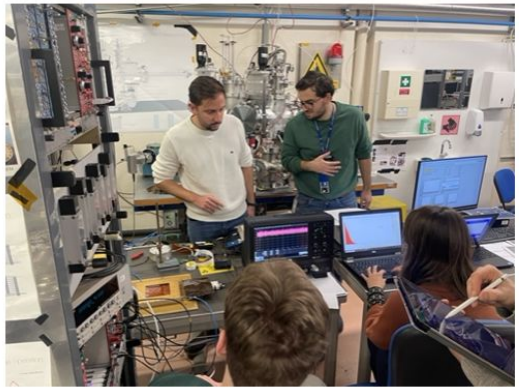




Lab exercises






Organising DRD1 Gaseous Detector School in 2024

- Single school for 2024, to be discussed for next years
- Regular (yearly) school targeted at students / young researchers / DRD1 community

- Based on previous school with **extension to other gas detector technologies**
- Similar format: lecture program open to community + lab exercises
- **Extended length** - 7-10 days?
- At CERN or other institute

- Planned for late 2024 - possibly connected to last DRD1 Collaboration Meeting this year

Draft schedule for extended school

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday
9:00 - 10:00	Introduction	Technologies	Manufacturing	Readout techniques	Data Processing	Work in lab groups	Social event	Applications	Student presentations
10:00 - 11:00	Gas detector physics	Technologies	Modelling	Readout techniques	Data Processing			Applications	
11:00 - 11:30	Break	Break	Break	Break	Visits			Break	Break
11:30 - 12:30	Gas detector physics	Technologies	Modelling	Readout techniques				Applications	Student presentations
12:30-12:45	Q&A session	Q&A session	Q&A session	Q&A session				Q&A session	
12:30 - 14:00	Lunch break	Lunch break	Lunch break	Lunch break	Lunch break	Lunch break		Lunch break	Lunch break
14:00 - 18:00	Lab session	Lab session	Lab session	Lab session	Lab session	Lab session		Lab session	Lab session
18:00 - 21:00		Student poster session							

Lab exercises - draft

- Extend lab program including gas detector technologies
- Additional simulation lab session (simulation 1&2)

Lab 1 Detector assembly	Lab 2 Instrumentation and detector operation	Lab 3 MPGD characterisation	Lab 4 RPC characterisation	Lab 5 Wire-based detector characterisation	Lab 6 Readout techniques	Lab 7 Simulation 1	Lab 8 Simulation 2
Survey of different gas detector technologies with microscope, electrical testing of amplification structures, assembly of detector stack	Familiarity with typical lab instrumentation, gas systems, HV supplies, readout chains, signal shapes, basic operation and readout	In-depth detector characterisation, voltage scans of drift/transfer/amplification fields, effect of change of operating conditions	Operation and common characterisation measurements	Operation and common characterisation measurements	Electronic and optical readout techniques, e.g. tracking, imaging, basic reconstruction	Introduction to Garfield++ based simulation, basic modelling, electric field map, microscopic tracking	

- Please let us know if you could propose / prepare a lab exercise!

Organising DRD1 Gaseous Detector School in 2024

- Organisation starting from now
- Selection of location
- Selection of time - connected to DRD1 Collaboration Meeting end of the year?
- Identify new lectures

- Propose lab exercises on RPC, Wires, …? Volunteer as tutor? Let us know!

Schools and training events

- Simulation school - WG4 - in 2025

Training Events

- Hand-on trainings about straw assembly and techniques
- Exchange of technical drawings, info about suppliers, … to facilitate new straw detector projects (possible to organise when production is ongoing, hard for smaller groups / in view of time-limitations / temporary personnel)
- MPGD training events: GEM and Micromegas detector design and assembly training (GEM detector design: Lecture session / Micromegas detector design: Lecture session)
- Readout system training events - VMM/SRS?

?

School format and scope?

Lab activities to propose?

Other training events?

Technical resources / forum / e-groups

Technical resources

- Meetings among WG convenors to discuss about existing/new resources including forum, databases, website, repositories, etc.

Common resources - deliverables per WG

WG	Resource	Implemtation	Status	Next activitites
3	Common gas properties database	Consider adapting existing solution - possibly similiar to Aachen Gas DB	Contact with Stefan, open to collaborate	Collecting WG3 community, identify way to proceed
3	Report for a common approach			
3	Common construction material database	Model after existing gas properties database - similiar solution?		
3	Common resisitve mateials database	Model after existing gas properties database - similiar solution?		
4	Software repository, examples	Webpage: Compilation of available software packages, links		Interest in forum?
4	Software repository, examples	Maintenance of existing Garfield++ webpage with examples, existing Garfield++ category in ROOT forum		
		Availble access to resources?		
5	Documentation repository			
5	Sharing of schematics/firmware/software	Gitlab		Existing / to be posted on WG5 website?
5	Discussion forum	Discord	Exisitng for SRS/VMM user group	Advertise existing
6	Repository for reports	EOS + list in doc + links on webpage		
6	Production needs, facilities & capabilities from additional survey	DB, Common vs. collaboration facilities / access, existing equipment (also from large projects) that can be	Additional survey to be conducted	
6	Technology transfer database / partners	List/page of industrial partners rather than DB, classify, which components, previous experience		
6	Online support forum (experiences / best practices)		Discourse forum drd1-forum.web.cern.ch	
7	Detector Laboratories Network	Webpage		
7	Laboratory Handbook			
7	Database of test beam facilities with potential local support	Table on webpage, link to https://irradiation-facilities.web.cern.ch/index.php		
7	Database of irradiation facilities with potential local support	Table on webpage, link to https://irradiation-facilities.web.cern.ch/index.php		
7	Database on ageing study setups			
7	Database on outgassing and ageing effects of tested materials			
7	Documentation of existing hardware / common infrastructure			
7	TWiki page with module manuals and schematics, software	Links to existing resources, new TWIKI/resources for other projects		Create Twiki / integrate in Forum?
7	Discouse		to be started soon	
7	Test Facilities Database	Specific to DRD1	Webpage list	
8	Repository for DRD1 notes	EOS + list in doc + links on webpage, notification/"newsletter"	Created, identify responsible for mainten	port RD51 notes in subfolder, invite submissions
8	List of training opportunities / events		Created, fill, maintain	add list of workshops / conferences?
8	Database of experts on specific topics	WG convenors contacts		
8	Job opportunities listing	Webpage https://drd1.web.cern.ch/other-jobs	Created, fill, maintain	

Technical solutions options (please list ideas)
Webpage
Twiki
Classical web forum
EOS/CERNbox space
Gitlab
Discord (check with WG5)
other ideas?

DRD1 Forum

https://drd1-forum.web.cern.ch/

Classical web forum (Discourse) to host questions and replies

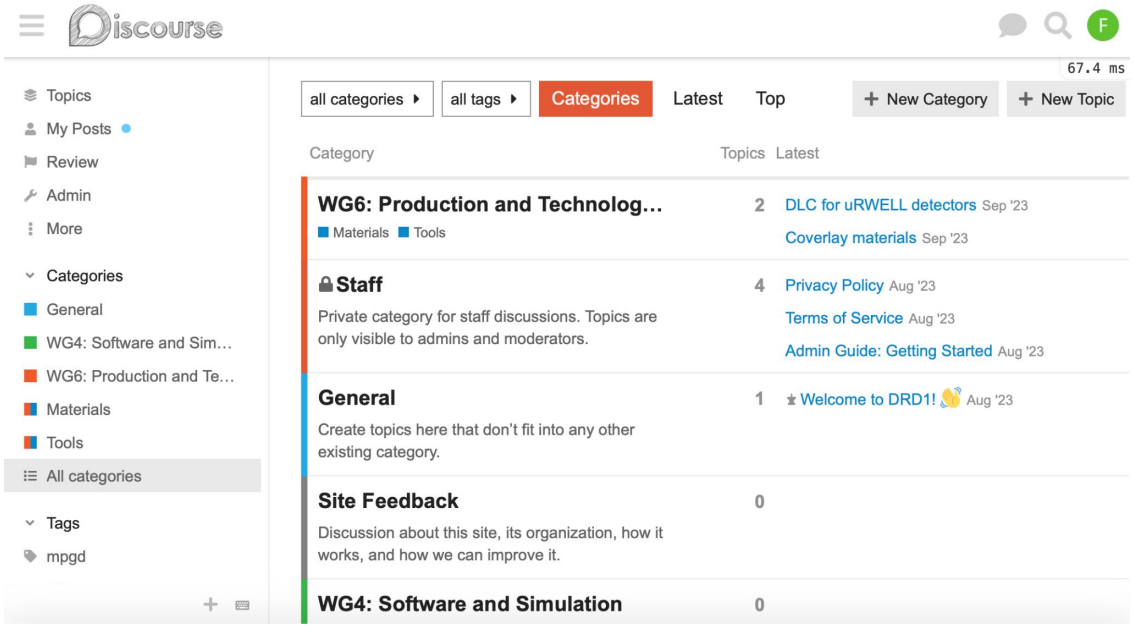
WG6: Production and Technology Transfer: Experiences, best practices

WG4: Software and Simulation

WG convenors starting to add content, ready to post questions / replies

Sign up with same/different account

Let us know in case of any questions.



Mailing lists

- Mailing lists: https://drd1.web.cern.ch/egroups

Work group participants - please self-subscribe if interested in WG activities:

- DRD1-WG1: Participants of WG1 - Subscribe
- DRD1-WG2: Participants of WG2 - Subscribe
- DRD1-WG3: Participants of WG3 - Subscribe
- DRD1-WG4: Participants of WG4 - Subscribe
- DRD1-WG5: Participants of WG5 - Subscribe
- DRD1-WG6: Participants of WG6 - Subscribe
- DRD1-WG7: Participants of WG7 - Subscribe
- DRD1-WG8: Participants of WG8 - Subscribe

Work group convenors for each WG: DRD1-WGx-convenors@cern.ch -> contact point, listed on WG web pages

Mailing lists

- Mailing lists: https://drd1.web.cern.ch/egroups

Work Package participants - either self-subscribe or managed by WP leaders:

- DRD1-WPx: Participants of WPx

Work Package coordinators: DRD1-WPx-contact@cern.ch -> contact point, listed on WP web pages

DRD1 Notes / Job Opportunities / Newsletter / Other Resources

DRD1 Summer Students

Possible **CERN summer student projects** to address DRD1 common interests from next year on (2025)

2-3 months studentship at CERN in Jun/Jul/Aug period, MSc-level students eligible

May be linked to specific working group activities (e.g. test beam activities, simulation tools, electronics and instrumentation)

Work on projects of common interest to the collaboration with report on achieved results

Main requirement: **continuous supervision** at CERN during the project

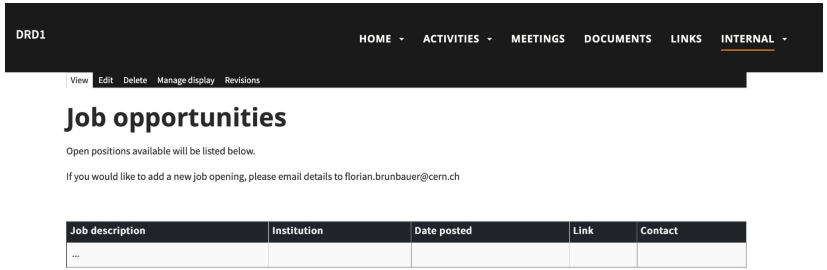
Existing experience, activities and initiatives

Job opportunities

- Circulating job opportunities via mailing list
- Listings on webpage: https://drd1.web.cern.ch/other-jobs

Please send us job opportunities:

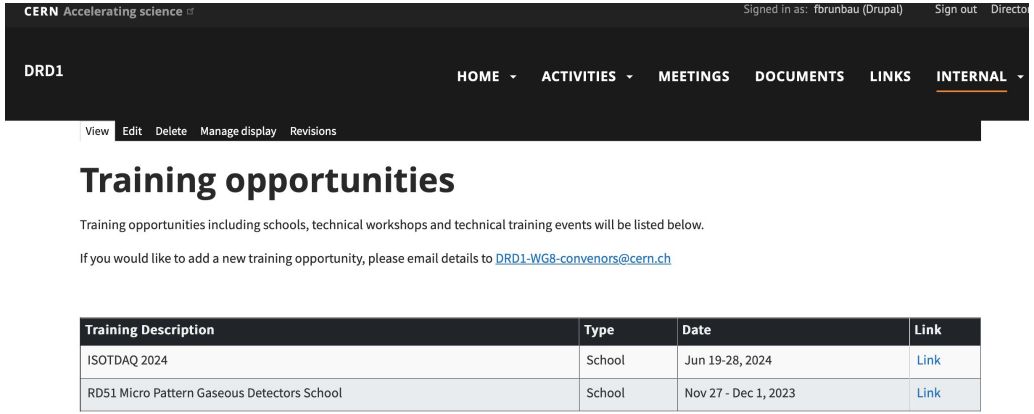
DRD1-WG8-convenors@cern.ch



Training opportunities

- Collection and listing of relevant training opportunities on DRD1 Website
- Please send us link for any relevant schools/training events you are aware of!

https://drd1.web.cern.ch/training-opportunities



DRD1 Notes

Webpage: https://drd1.web.cern.ch/notes

Objectives:

- Integration of published papers contents, for future reference
- Keep track of (young people) work in published articles

DRD1 notes handling:

- Submission: write to email list (drd1-notes@cern.ch)
- Light review (ensure scientific content and consistency with DRD1 research objectives)
- Public list of notes on repository, but content private (available to all DRD1 members)
- No predefined format (but we can consider to require empty space on first page to add id number)

Other related items: Master/PHD thesis repository ?

DRD1 Newsletter

- Regular communication sent to **DRD1-all** mailing list
- Content:
  - Upcoming DRD1 activities (meetings, test beam, training events)
  - New job opportunities posted on website
  - Upcoming training opportunities
  - Potential updates from WGs

- Will be started from Feb/March on, prepared by Diego Gonzalez Diaz

WG8 Training and Dissemination

https://drd1.web.cern.ch/activities-wg8

Self-subscribe to WG8 Mailing List for updates, meetings and info:
https://e-groups.cern.ch/e-groups/EgroupsSubscription.do?egroupName=drd1-wg8

WG8 general meetings (≈2-3 per year) starting Feb/March
Dedicated sub-meetings on School Organisation, topical workshops, DRD1 Awards, … frequency as needed

Potential of WG8 in DRD1

Exchange of experience between communities

- Schools and training events open to all can serve to share knowledge
- Interest of training events also for **senior researches** to be exposed to other gaseous detector technologies
- **Training events for technicians** (motivating detector designs and sharing technical experience - materials, mechanics, support structures, …)
- Research **visits** to institutes with ongoing **detector production** cycles for training
- **Summer student projects** focused on common needs and activities (electronics and instrumentation, simulation tools, common test facilities)

Links to other DRD1 WGs

- Training/knowledge sharing events organised together with other WG convenors - some examples:
- WG4 - Simulation School, exchange of educative materials on simulations
- WG5 - Courses/training on common readout electronics (SRS) and gas detector R&D instrumentation
- WG6 - Technology transfer to industry - training courses, industry contacts, exchange experiences
- WG7 - Common facilities are great opportunity for training and exchange, dedicated courses on e.g. “test-beam operations”

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Common training events / schools linking technologies?

Technical training courses linked to common facilities?

Wide or narrow topical workshops in DRD1 meetings?

Awards / prices / recognition of young researcher activities?

Common listing of job opportunities - website/mailing list?

Database of “experts” to share contacts and resources?

Roles in DRD1 for young researchers?

Promote common project funding for young researchers?

Compilation and maintenance of “handbook”
on R&D instrumentation and techniques?