The Online Research Group Teaching Model

Ensuring Authentic and Robust Remote Learning for MSc Students

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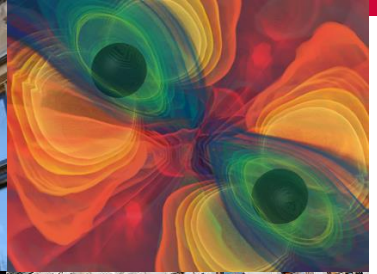
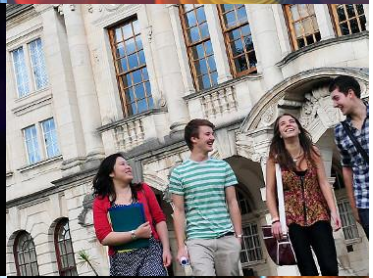
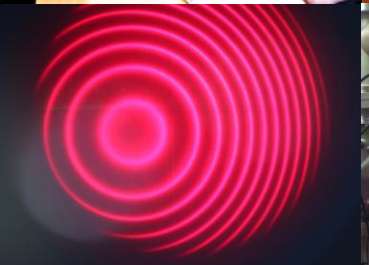
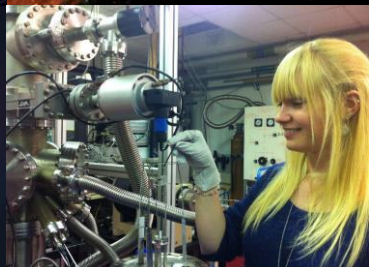
School of Physics and Astronomy



PHYSX MSc programmes as of 2020/21

Physics focus

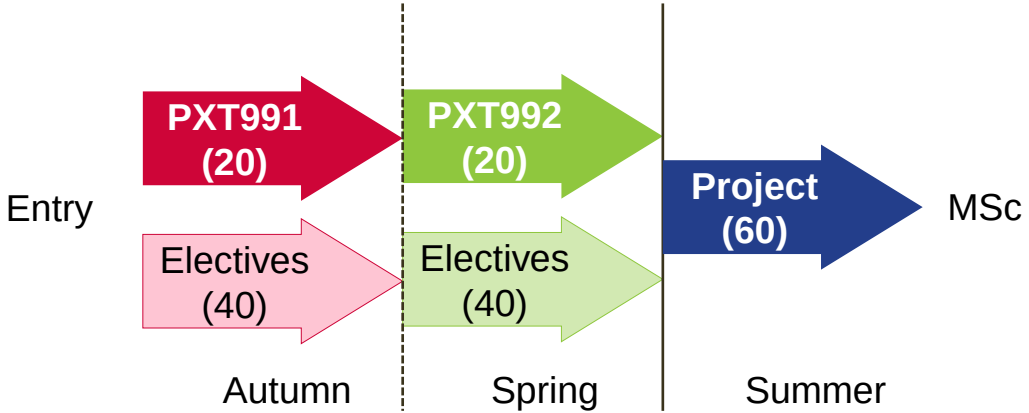
- MSc Physics
- MSc Data-Intensive Physics
- MSc Compound Semiconductor Physics*

Astrophysics focus

- MSc Astrophysics
- MSc Data-Intensive Astrophysics
- MSc Gravitational Wave Physics

* Standalone and Year 1 of CS Manufacturing CDT

PHYSX MSc structure, cohort size, student satisfaction



Cohort size

AY	Home	Intl.	Total
21/22	(40)	(25)	(65)
20/21	37	19	56
19/20	19	20	39
18/19	18	6	24
17/18	15	4	19
16/17	19	3	22
15/16	12	2	14

PXT991: research culture orientation, project-based learning
PXT992: research skills development, research project preparation
PXT999: research project, student conference

Modality: 2 stage, full time, 1 year
Rulesets: 30cr resit limit, 60cr repeat limit, 50% pass mark

MEQ scores

AY	PXT991	PXT992
20/21	88	94
19/20	89	-
18/19	86	87
17/18	94	91
16/17	90	88
15/16	94	85

Selected PHYSX MSc highlights, 2015/16 to 2020/21

Realism in practice

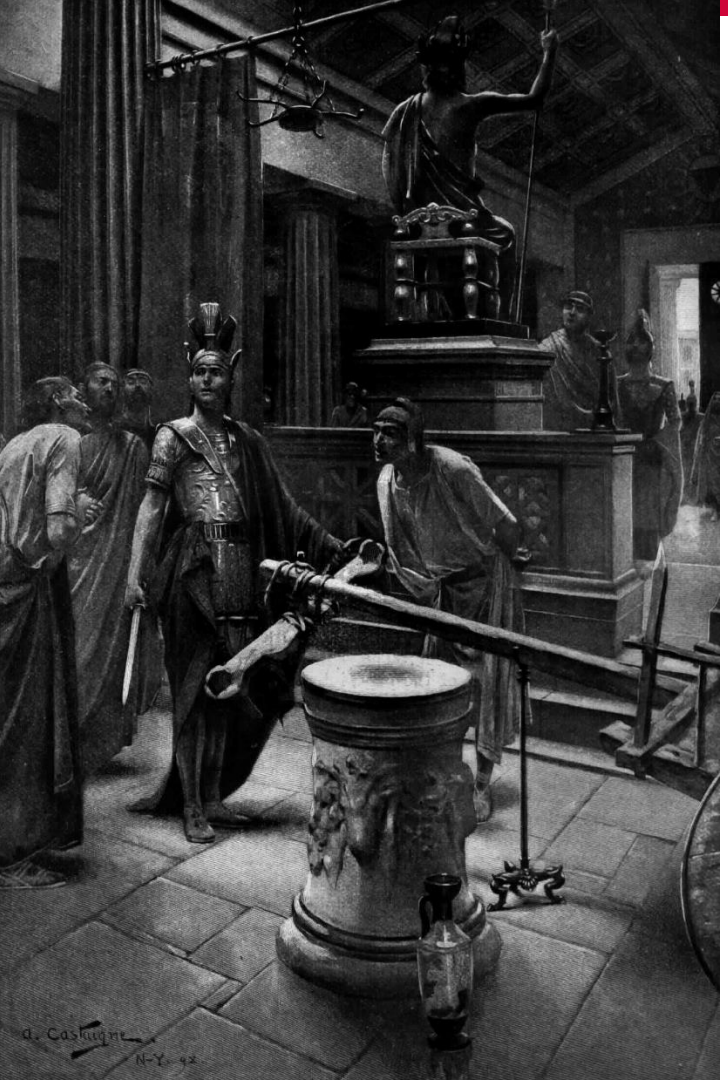
- **Development of a highly authentic research group teaching model**
- Student-lead project-based learning, embedded research skills training
- Dedicated MSc facilities with student ownership of space and MSc coordinator co-location

MSc student identity, former MSc students (now PhD students) as teaching colleagues

- Strong emphasis on **culture transition** and students' **self-identification as scientists**
- **PhD student demonstrators:** 1× AFHEA, 3× working towards AFHEA, 1× working towards FHEA

Feedback, scholarship outputs, awards

- Consistently excellent **student feedback, career outcomes,** and **external examiner feedback**
- 3 journal articles, 3 case studies, 3 international talks at conference, 4 national talks at conference
- 1 National Teaching Fellowship, 2 international awards, 2 institutional awards
- 3 ESLA nominations, 1 international award nomination



How to maintain an effective **remote** community of practice?

Online research group teaching model (autumn, spring)

- Research group the basic unit of interaction and support
- Rapidly form tight-knit communities
- Regular whole cohort activities to keep everyone in sync

PGR (former MSc) students as teaching colleagues

- PGRs act as research group leaders, mentors, role models
- PGRs engaged at every level of course planning and delivery
- Support programme to work towards AFHEA, FHEA

Other enhancements (not exhaustive!)

- Standardised Learning Central core module pattern (HATS)
- Standardised scripts and rubrics for core modules
- Standardised PGT and PGR support modules
- Regular emails, masterclasses, supplementary materials, etc.
- Mentoring system for summer projects
- Balanced (25 – 35%) group assessment components

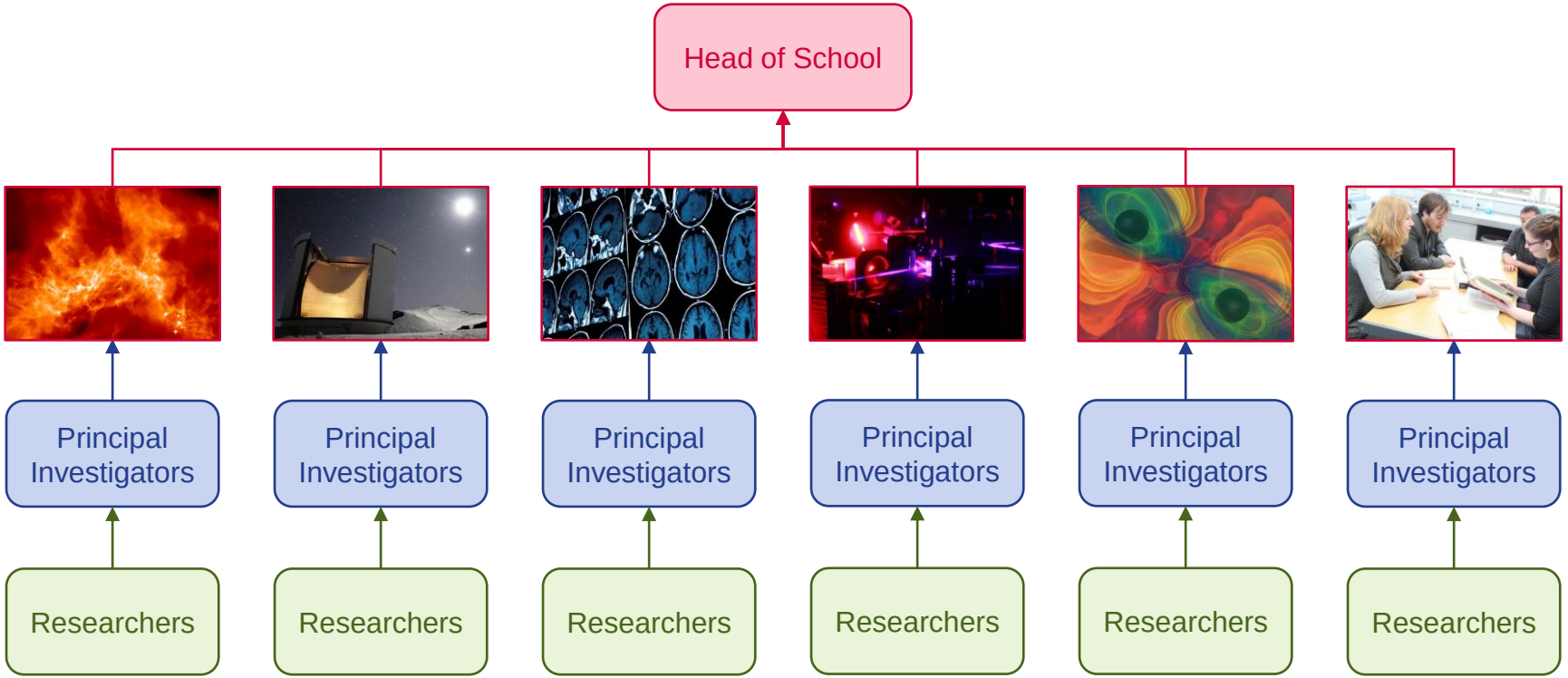


Online research group teaching model (autumn, spring)

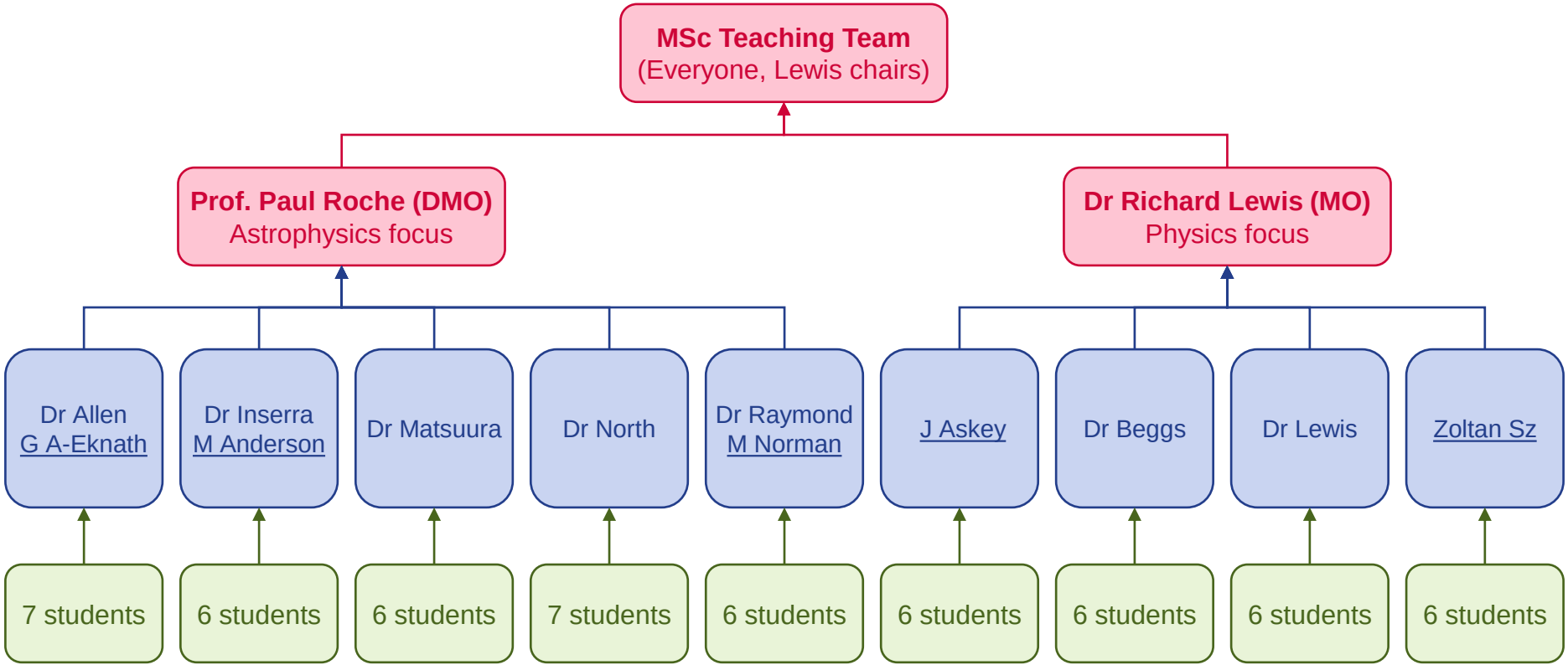
- MSc students are organised into groups about 6 students, by degree scheme
- Each group has an academic / PGR lead for direct support
- Group members form a mutual support group
- Richard and Paul provide oversight and additional support

- **Highly realistic:** this is analogous to how PHYSX research groups function
- **Highly robust:** support structures overlap with no single points of failure

PHYSX research group structure (simplified)



PXT991 (autumn) micro project research group structure* (2020/21)



* This structure is maintained throughout the spring semester for PXT992



PGR (former MSc) students as teaching colleagues

- PGRs considered teaching **colleagues**, not just demonstrators or assistants
- PGRs are formally members of the MSc teaching team

- PGRs act as research group leaders, group support, mentors, and role models
- PGRs are relatable, enthusiastic, and creative

- Academic leads support PGRs to work towards AFHEA, FHEA status
- **Virtuous cycle** of MSc students becoming skillful practitioners

PGR activity and highlights

	Cohort size			MEQ scores		Activity	
AY	**Home**	**Intl.**	**Total**	**PXT991**	**PXT992**	**PGRs**	**Current PGR milestones**
21/22	(40)	(25)	(65)			**7**	Expansion and refinement of model
20/21	37	19	56	**88**	94	**4**	Successful transition to online delivery
19/20	19	20	39	**89**	-	**4**	Group lead, support, project design
18/19	18	6	24	**86**	87	**2**	Group lead and support
17/18	15	4	19	**94**	91	**2**	Current PGRs complete MSc
16/17	19	3	22	**90**	88	**0**	
15/16	12	2	14	**94**	85	**0**	

PXT991 Advanced Tech's in Physics and Astrophysics

Autumn semester core module: PGR activity highlights

- Act as project leads and deputy leads
- Weekly supervision meetings with research groups
- Design, deliver, and reflect upon support sessions
- Attend and contribute to PXT991 planning meetings
- J. Askey designed a micro project and lead it in 20/21
- Full suite of activity aligned to AFHEA requirements

PXT992 Advanced Study and Research Skills

Spring semester core module: PGR activity highlights

- Act as breakout session leads
- Zoom session co-pilots (cohort chat)
- Design, deliver, and reflect upon support sessions
- Attend and contribute to PXT992 planning meetings
- Mentor their groups throughout the spring semester
- Full suite of activity aligned to AFHEA requirements

MSc student feedback for autumn / spring 2020/21

PXT991 Advanced Tech's in Physics and Astrophysics
Autumn semester core module, MEQ score: **88**

"This has been a good opportunity to delve into much more independent group research and study, mimicking a real research setting."

"The design, structure, and purpose of the module have been very clear. The whole cohort sessions have generally been very useful, and I feel like this module is setting me up for success in future project work/academic study."

"The communication between everyone despite being entirely online this year [has worked well]. My mentor has been extremely supportive throughout and really helped us all to enjoy the module. **The group aspect hasn't felt strained due to the online nature of the course at all**."

PXT992 Advanced Study and Research Skills
Spring semester core module, MEQ score: **94**

"Great module for getting into a research mindframe Interactive breakout rooms working as a group interview process."

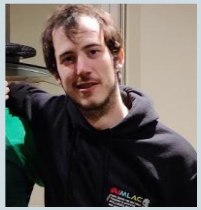
"This module has been great! Thoroughly enjoyed every element. Each Assignment has improved various skills such as creating videos, Presenting ideas, group work, Report writing, building an outreach program etc."

"Very nice continuation on PXT991 in helping students master research skills and things "beyond university", be it grant proposals or critical marking – a nice corner of learning often overlooked (especially in undergrad courses). Good to shift gradually away from group to independent work over the semester, rather than suddenly."

The PGR perspective – poster session tomorrow at 11:00–11:30

M. Anderson, J. Askey, G. Athikkat-Eknath, M. Norman, and Z. Sztranyovszky




The Research Group Teaching Model:
PhD Students as Research Group Leaders, Mentors, and Role Models

From the abstract:

The authors have, for the past three academic years, provided essential research group leadership and teaching support for the research group activities. This poster aims to provide insight into, and reflections on our roles as student co-creators and developing educational practitioners.

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