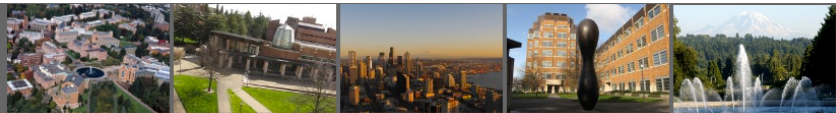


<http://www.physics.ohio-state.edu/~ntg/TALENT/>



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TALENT / INT Course on

## **Nuclear forces and their impact on structure, reactions and astrophysics**

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**July 1–19, 2013**

**Institute for Nuclear Theory, University of Washington, Seattle, WA**

### **Dedication**

This course is dedicated to the memory of [Gerry Brown](#) (1926–2013) and [Ken Wilson](#) (1936–2013).

### **Overview**

The TALENT/INT course on Nuclear Forces is part of the TALENT initiative ("Training in Advanced Low-Energy Nuclear Theory") to develop a graduate program of excellence in low-energy nuclear theory. The program will build a network of strong connections between universities and research laboratories

# TALENT/INT Course: Schedule of lectures — a: 9am and b: 11am

## Week 1: July 1-5

Monday	Tuesday	Wednesday	Thursday	Friday
QCD 1 (as)	Nuclear forces 1 (rjf)	Nuclear forces 2, pionless EFT (rjf)	Cold atoms and neutrons, Quantum Monte Carlo (ag)	Quantum Monte Carlo and chiral EFT interactions (ag)
Scattering theory 1 (rjf)	Scattering theory 2 (as)	Renormalization and universality (as)	Tensor/spin-orbit forces, deuteron properties (rjf)	Three-body forces and halo nuclei (as)

## Week 2: July 8-12

Monday	Tuesday	Wednesday	Thursday	Friday
Chiral EFT 1 (as)	Chiral EFT 2 (rjf)	Renormalization group 1 (rjf)	Renormalization group 2 (rjf)	Three-nucleon forces 2 (as)
QCD 2 (rjf)	Three-nucleon forces 1 (as)	Nuclear forces from lattice QCD, hyperon-nucleon interactions (as)	Nuclear forces and electroweak interactions (as)	Many-body overview (rjf)

## Week 3: July 15-19

Monday	Tuesday	Wednesday	Thursday	Friday
Many-body problem and basis considerations (as)	Neutron matter and astrophysics (as)	Nuclear lattice simulations (rjf)	Nuclear forces impact on nuclei (rjf)	From forces to density functionals (rjf)
Many-body perturbation theory (rjf)	Operators for external probes (rjf)	Nuclear matter (as)	Nuclear forces and exotic nuclei (as)	Impact on fundamental symmetries (neutrinos, dark matter, ...) (as)

## TALENT/INT Course: Other logistics (tentative)



- Lecture a from 9am–10:30am; lecture b from 11:am–12:30pm every day in A114
- Reconvene at 2pm in A114 for general questions, etc.
- A114 is available for us to use all day until 6pm
- A212 and A214 are available from 2:30pm–6:30pm (but not A214 until Wednesday)
- Cookies and coffee/tea here at 4pm every day
- Library and computer lab available

## TALENT/INT Course: Comments on exercises

- Recap of philosophy: active learning
- Wide range of problems: be sure to discuss
- If a problem is taking a lot of time, ask for help
- Don't worry if you get stuck: this is not a test!
- Solutions are not turned in or graded (but check them!)
- Operational goal: By the end of the course, most of the listed lecture notes, review articles, essays and talks will be understandable (at least in part) to the participants.

# TALENT/INT Course: Instructors — ask questions!

## TALENT / INT Course on Nuclear Forces

### Course Instructors

#### Principal Lecturers



[Dick Furnstahl](#)

Professor of Physics

[The Ohio State University](#)



[Achim Schwenk](#)

EMMI Professor of Physics

[Theory Center, Institute of Nuclear Physics  
Technische Universität Darmstadt](#)

#### Special Lecturer



[Alex Gezerlis](#)

Assistant Professor of Physics

[University of Guelph](#)

#### Expert Facilitators



[Michael Forbes](#)

INT Fellow, Research Assistant Professor

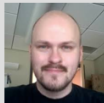
[Institute for Nuclear Theory](#)



[Kai Hebeler \(July 15-19\)](#)

Herzberg Fellow

[Theory Center, Institute of Nuclear Physics  
Technische Universität Darmstadt](#)



[Heiko Hergert \(July 1-19\)](#)

Postdoctoral Researcher

[The Ohio State University](#)

# TALENT/INT Course: Instructors — ask questions!



**[Jeremy Holt](#)**

Postdoctoral Researcher

[University of Washington](#)



**[Georgios Papadimitriou \(July 1-13\)](#)**

Postdoctoral Researcher

[University of Arizona](#)



**[Carolina Romero-Redondo \(July 4-19\)](#)**

Postdoctoral Researcher

[TRIUMF](#)



**[Gang Shen](#)**

Postdoctoral Researcher

[Institute for Nuclear Theory](#)



**[Vittorio Somà \(July 1-9\)](#)**

Postdoctoral Researcher

[Theory Center, Institute of Nuclear Physics  
Technische Universität Darmstadt](#)



**[Andrew Steiner](#)**

INT Fellow, Research Assistant Professor

[Institute for Nuclear Theory](#)



**[Kyle Wendt \(July 1-9\)](#)**

Graduating PhD student

[The Ohio State University](#)

# TALENT/INT Course: Participants — self-organize!

