The current funding landscape: Live from UC Irvine with Past President Charles Limoli

Friday, May 1
4pm ET
Janet E. Baulch is a project scientist in the Department of Radiation Oncology at the University of California, Irvine. She received her Ph.D. in Developmental Biology from the University of California, Davis in 2000. She remained at UC Davis, first as a postdoctoral fellow and later as assistant professor in the Division of Reproductive Biology, Department of Obstetrics and Gynecology in the School of Medicine, residing at what is now known as the Center for Health and the Environment.

In 2005, Janet was recruited to the Department of Radiation Oncology, Radiation Oncology Research Laboratory at the University of Maryland School of Medicine. She remained at the University of Maryland until 2013 when she was recruited to Charlie Limoli’s radiobiology department at UC Irvine. Dr. Baulch has been funded by the DOE Low Dose Program, NASA and DTRA to study terrestrial or space radiation effects on heritable endpoints, genomic instability, and more recently, neurocognition, and the epigenetic mechanisms that might underlie these radiation induced phenomena.
Presenter: Charles Limoli, PhD

Professor, Radiation Oncology
School of Medicine, UC Irvine

Dr. Limoli received his BS degree in chemistry from MIT then went on to receive his PhD in Biomedical Sciences from UCSD. Following a postdoc at UCSF, he received his first academic appointment at that institute where he stayed for 12 years before going to UCI in 2006.

Since that time Dr. Limoli’s research has focused on radiation effects in the CNS, where he has defined many of the mechanisms that contribute to radiation-induced cognitive dysfunction. His work has since defined the importance of oxidative stress in the brain, how irradiation disrupts neuronal structure and synaptic integrity and how stem cells can be used to offset the adverse effects of both radio- and chemotherapy in the brain.

Continued work strives to further understand the causes, consequences and potential remedies for neurocognitive dysfunction caused by various cancer treatments. Dr. Limoli is a professor in the Department of Radiation Oncology at the University of California Irvine.
More Learning Opportunities!

**RRS Member Discussion Forums**
- Rad Women in Science – [radres.org/RadWomen](http://radres.org/RadWomen)
- Early Career Investigators – [radres.org/ECIForum](http://radres.org/ECIForum)
- Coronavirus – [radres.org/Coronavirus](http://radres.org/Coronavirus)
- Coming soon! The RadRes eJournal Club

**RRS Vodcasts**
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Radiation Research Program & Collaborations in the US Government

NIH NATIONAL CANCER INSTITUTE

Div. Cancer Treatment and Diagnosis

Radiation Research Program

Radiotherapy Development Branch

Clinical Rad. Oncol Branch

Molecular Radiation Therapeutics

CIP, CDP, TRP, BRB, CAM

Dev. Therap. Program

DCEG, Rad Effects Br

Rad Oncol Branch

Rad Biology Branch

Molec Imag. Program

Courtesy of Drs.’ Pataje Prasanna and Mansoor Ahmed
Radiation Oncology Research Funding at NCI

Radiation Research Program

- Cancer Therapy Evaluation Program
- Cancer Diagnosis Program
- Cancer Imaging Program
- Developmental Therapeutic Program
- Division of Cell Biology
- Division of Cancer Control and Population Sciences
- Small Business Innovation Research Development Center

Courtesy of Drs.’ Pataje Prasanna and Mansoor Ahmed
<table>
<thead>
<tr>
<th>Activity Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-30/31/32/33</td>
<td>Predoctoral, Post-doctoral, and Senior fellows</td>
</tr>
<tr>
<td>K-01/08/12/18/22</td>
<td>Career development awards</td>
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<tr>
<td>P01</td>
<td>Research Program Projects</td>
</tr>
<tr>
<td>P-20</td>
<td>Exploratory grants</td>
</tr>
<tr>
<td>R-01</td>
<td>Research projects</td>
</tr>
<tr>
<td>R-03</td>
<td>Small grants</td>
</tr>
<tr>
<td>R-13</td>
<td>Conference grants</td>
</tr>
<tr>
<td>R-15</td>
<td>Academic research enhancement awards (AREA)</td>
</tr>
<tr>
<td>R-21/33</td>
<td>Exploratory/developmental grants</td>
</tr>
<tr>
<td>R-37</td>
<td>Method to extend research in time (MERIT) award</td>
</tr>
<tr>
<td>R-41/42</td>
<td>STTR grants, Phase I and II</td>
</tr>
<tr>
<td>R-43/44</td>
<td>SBIR grants, Phase I and II</td>
</tr>
<tr>
<td>U-01/19</td>
<td>Co-operative agreements</td>
</tr>
<tr>
<td>U-43/44</td>
<td>SBIR Co-operative agreements</td>
</tr>
</tbody>
</table>
Funding Data in Radiation Oncology by Activity for FY 2017 (Total: $106 M)

Courtesy of Drs.’ Pataje Prasanna and Mansoor Ahmed
Grant Topics Funded by RRP (Awards as of Nov. 2017)

- Nanoparticle Particles and Proton Radiation: 7% and 6%
- Cancer Biology and Responses to Radiation: 10%
- Biomarkers & Predictive Assays: 5%
- Molecular Targeting of Tumor Signaling: 14%
- Non-ionizing Radiation: 10%
- Radioimmunotherapy / Systemic Radiotherapy: 14%
- Therapeutic Imaging / IGRT: 8%
- Physics and Technology: 6%
- Tumor Microenvironment: 6%
- Normal Tissue: 5%
- Immune Effects: 7%
- Other (Radiochem Minority Health, Conferences): 2%

Courtesy of Drs.’ Pataje Prasanna and Mansoor Ahmed
Research Opportunities & Gaps in the Current Portfolio

• Biomarkers of Radiation Response
  Genomic / proteomic other – “omic signatures” of response
  Circulating tumor cells / cell free DNA
• Preclinical studies on the role and mechanisms of radiation in the immune response to tumors
  Novel models
  Dose, dose distribution
  Timing relative to checkpoint inhibition
• Microbiome and Radiation Response
• Dosimetry for, and radiobiology of systemic radionuclide therapy
• In-line particle beam dosimetry
• MicroRNA therapeutics as radiation-effect modulators
• Machine learning to understand the effect of radiation on tumor and normal tissues
Molecular Radiation Therapeutics (MRT)

MRT working groups provide a forum for the discussion of clinical translation of various pre-clinical ideas

Colorectal Cancer
Chair: Thomas J. George

Sarcoma
Chair: Dian Wang, M.D.

Lung Cancer
Chairs: Bo Lu and Steven H. Lin

Upper GI
Chairs: Salma Jabour and Terrence Williams

Radiation and Immune Modulation
Chair: Samir N. Khleif, M.D.

Grid, Lattice, Flash and Microbeam Radiotherapy
Chairs: Quynh-Le, Simone, Mohiuddin, Wu, Zhang, Griffin, Bentzen and Limoli
Some helpful hints and strategies for preparing a competitive extramural grant application
Before you start your grant

• **Read the specific RFA**
  • Familiarize yourself with the critical details
    • Scientific emphases – what they are looking for
    • Due dates -
    • Budget limitation – Know the difference between total, direct and indirect costs
    • Specific exclusions (clinical trial or not, etc.)

• **Have a conversation with your program officer**
  • They are there to help and save you time
While you begin to think about the science

• Collect all the administrative information
  • Including internal/external budget justifications
    • Submit well ahead of time to avoid administrative delays – this is boring but necessary so you can focus on the science as the due date arrives

• Grant structure:
  • Experimental plan should be half the grant
  • For a 12 page R01 – Preliminary data should be 3-4 pages
  • Everything else must fit in the remaining 2-3 pages (Significance, Innovation, Scientific premise, etc.)

• Simpler is better – avoid too many acronyms
• Almost every grant is over-ambitious – don’t make it obvious
Now the Science – first stage

• Nail the specific aims page – single most important page of the grant.
  Ask yourself the following:
  • Does it address an important gap in knowledge or controversy? This defines significance.
  • Does it propose a straightforward, overarching hypothesis?
  • Do the aims address the hypothesis? Surprisingly many grants fall short on this critical point.
  • Is the approach innovative – what do you bring to the table that most others cannot.

• Try and make the aims independent, but interlinked. If aim 1 fails you don’t want the entire grant to fall apart
Now the Science – Polishing the aims

• The best grants use combinations of approaches (in vitro, in vivo and/or clinical samples/trial).

• Some aims need to address the mechanism underlying your hypothesis.

• Carefully think about the order of your experimentation (aims).
  • If a lot of mechanistic studies are proposed without a clear functional consequence – it has less impact. Best to have a well defined functional outcome and develop the mechanistic basis of that outcome.

• For a R01 - no more than 4 aims – simple statements are best.

• For a R21 - no more than 2 aims.
Now the Science – moving on

- Significance: succinct and to the point (typically ½ page).
- Innovation: What’s unique about your proposal 1 paragraph.
- Introduction: 1-1.5 pages – does not have to be a review!
- Experimental plan
  - State the aim again, then the rationale, then the overall approach – include important specifics:
    - Number of cell lines, origin, number of mice, sex, strain, carefully define cohorts.
    - Too many experimental details do not help
    - Be honest about the limitation and expectation
  - Nothing irritates a reviewer more than proposing a complicated series of studies and stating that “no problems are anticipated” – that’s just nonsense.
Nearing the end of the road

• As your grant nears completions – hopefully (realistically) 2 weeks before it’s due - one of the more important steps in the whole process is: Have someone else go through it!

• Give it to 2 different scientists for critical input -
  • One should be someone familiar with your work or field of study. This individual will help you identify any potential critical flaws.
  • The other should be someone outside your expertise. This individual will likely give you a good read whether the application is fundable. Typically you’ll have 3-4 reviewers and only 1 will likely be an expert in the field. SO…if the non-expert can’t understand what you wrote – your grant is doomed.
Some final thoughts – mostly obvious but maybe not

• Complicated, overambitious grants rarely get funded – they are typically refined over several cycles of revision.

• The process at the NIH is fair, but imperfect and slow. That said it is the best system we have at the moment so don’t complain about it and learn how to write a better grant.

• The best way to learn about writing grants is to actively participate in a study section. So… when you’re invited by a program officer accept – it’s the best way to learn how the system works from the other side.

• Lastly – and my favorite point – don’t try to impress people/reviewers with how smart you are. We don’t care – we just want to know whether you can do the work you proposed!
I’m looking forward to seeing everyone in Hawaii
It will be a fantastic meeting and just the thing we need to get our minds back on track and back to our collective passion for the radiation sciences

See you all in October and wishing you the very best – Charlie
65th President of the Radiation Research Society