



The current status and future directions of CRS Focus Groups

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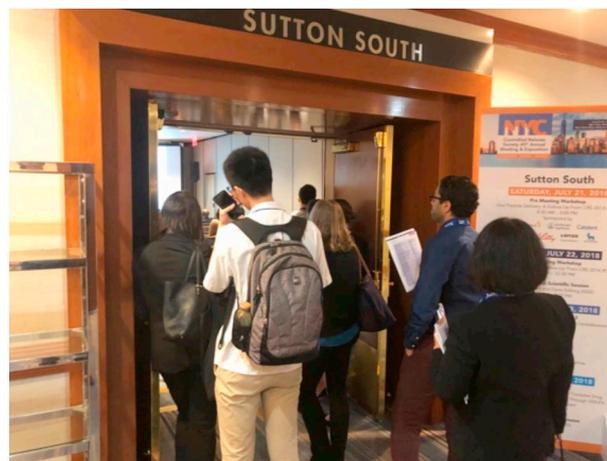
ABSTRACT

In 2018, the Controlled Release Society introduced a new, member-led organizational structure (called “CRS Focus Groups”) that provided new opportunities for members at any stage of professional development to be elected to leadership positions, be recognized for their work, and to become a part of close-knit communities in a variety of sub-fields of Controlled Release. This article provides a perspective that spans the origins of this initiative and motivation for building the Focus Groups, to the progress made to date and also a vision for the future of what the Focus Groups might one day become.

1. Introduction

If you attended the 2018 Controlled Release Society (CRS) Annual Meeting in New York, or were following social media about the event, you likely noticed something different as compared to recent years. There were several themed sessions, run by stellar young leaders of newly-established “CRS Focus Groups”, that were packed to over-capacity with attendees standing in the halls waiting for an opportunity to squeeze into these rooms. Beyond delivering outstanding scientific content, the focus groups offered new opportunities for CRS members to be recognized and contribute to the society, including:

- opportunities to receive Young Investigator Awards (for faculty and industry members) and Graduate Student/Postdoc Research Awards in each scientific focus group category by simply submitting an abstract to the Annual Meeting.
- a unique gateway, one evening, to introduce yourself personally to the Board of Directors of the Society, the Annual Meeting invited speakers (including the keynote speakers), and the CRS annual award winners, over snacks and drinks.
- 7:00 am “membership” meetings that were highly attended by members and prospective members that wanted to get involved in this new initiative.



Attendees waiting to get in to Focus Group Session presentations as standing-room only from the hallway of the Hilton convention Center in NYC in 2018.

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Members attending the Oral Delivery Focus Group Membership Meeting at 7:00am with Chair, Katie Whitehead, presiding.

2. What is a CRS Focus Group?

CRS Focus Groups are defined most simply as a collection of CRS members who are organized around a particular sub-field of Controlled Release, with a common interest in networking, being recognized, serving the CRS in an impactful way, and learning more about the particular sub-field. For instance, Focus Groups provide themed sessions at the annual meeting, as well as opportunities for members to win awards for their work. Focus Groups communicate with their members on a regular basis throughout the year, providing opportu-

of the CRS Board of Directors, or s/he is expected to attend board meetings as an observer. This additional visibility for the Focus Group leader and, thus, for all members of the Focus groups, provides both motivation and enhanced accountability. The result is expected to be stable, motivated, and accountable leadership of this important CRS initiative, thus resulting in delivery of higher member value throughout the year. This structure also affords direct communication of needs from the Board of Directors to the Focus Group leadership (and vice-versa), as well as a smoother transition of leadership of the Focus Groups on a regular basis, thus reducing the risk of leadership gaps.



Examples of highly attended Focus Group “Keynotes” from Samir Mitragotri (left) for the Biomimetic and Bioinspired Delivery Session and Daniel Anderson (right) for the Gene Delivery and Gene Editing Session.

nities for CRS members to stay up-to-date, network, and have their work acknowledged outside of the confines of the CRS Annual Meeting. Focus Groups effectively serve as a home base in the CRS for members who would call a particular group of people “my community.”

Similar initiatives had been explored by the CRS in prior years, including groups called, “Communities of Practice” and also “Focus Groups” at one time in our history. Each of these formats enjoyed success for multiple years. However, each of these initiatives dissipated over time, which typically occurred when leaders of those groups stepped down after a given term. This is consistent with my own experience in other scientific societies - if left unchecked, an initiative will rise and fall with the enthusiasm, drive, and commitment of its leadership. More so, given the busyness of academic and industrial life, the necessary commitment for leading a group can even wax and wane during the term of election/appointment. For this reason, the leadership of the new CRS Focus Groups (constituting an entire Focus Group Board of Directors) was designed to be organized and held accountable by an individual who reports directly to the Board of Directors of the Society. The Director of the Focus Groups is either an elected member

3. The problem that CRS Focus Groups intend to address

The Controlled Release Society is a small-to-medium-sized scientific society compared to most of the other Societies to which its members also subscribe, with approximately 1000 members and average attendance at the annual meetings of approximately 1100 (members and non-members). For perspective, from informal conversations with leadership of other societies, it can be approximated that:

- The American Institute of Chemical Engineers has approximately 60,000 members and attendance at annual meetings of approximately 5500 (members and non-members)
- The Biomedical Engineering Society has approximately 8000 members and attendance at annual meetings of approximately 4000 (members and non-members)
- The American Association of Pharmaceutical Scientists has approximately 8000 members and attendance at annual meetings of approximately 6300 (members and non-members).

Importantly, these Societies are generally the “primary” Societies (and annual meetings) for the disciplines of Chemical Engineering, Bioengineering and Biomedical Engineering, and Pharmaceutical Science, respectively. A large portion of the CRS membership falls within one or more of these three disciplines. Consequently, for a significant number of CRS members, the CRS Annual Meeting is the 2nd (or sometimes 3rd or 4th) meeting that they attend regularly.

For this reason (as well as a number of other reasons, including the strong international focus of the CRS that is underscored by alternating meeting locations outside of the US on a regular basis), attendance to the Annual Meeting has justified a relatively smaller venue compared to larger societies and a smaller number of meeting days (typically approximately 3 days from opening to closing reception). The Society has also continued to prioritize a significant percentage of the annual meeting time toward plenary speakers (typically luminaries). As a consequence, young principal investigators from academia and industry, postdoctoral researchers, and graduate students have had relatively few opportunities to deliver oral presentations at many past CRS Annual Meetings. For a PhD student, these talks can lead to a postdoctoral position in the laboratory of a lab where she/he will have a chance to publish in the best journals and to improve their CV. For junior faculty, this talk could be extremely important for tenure/promotion. Further, opportunities to serve in a leadership position in the Society were also limited, especially for promising young people, since there were only two “Divisions” (Consumer & Diversified Products and Preclinical Sciences & Animal Health) and the various committees of the Society were primarily selected by the Board of Directors. This previous structure represents a “top-down orientation” for engagement of members.

Unfortunately, for many young academic and industry investigators, the underlying motivation for career advancement and promotion is not compatible with a top-down engagement structure. From my own experience (having been a junior faculty member from 2006 to 2012 and then a Chair of an Academic Department in the US that is now 46% junior faculty (12/26) from 2012 to present), the motivations for junior faculty to be engaged in a Society are more complicated than just the opportunity to present their work in a poster format at an annual meeting. Indeed, junior faculty members are always actively building promotion dossiers that need to include a listing of (amongst other things):

- invited talks, including those at prestigious scientific meetings
- letters of recommendation from established investigators that are often introduced to (and impressed by) the young person's work when it is presented orally at a scientific meeting
- significant awards received
- funded grants and published manuscripts that are rewarded by peer-review, and
- demonstration of service and leadership in a relevant scientific society (preferably recognized by selection to the post by a Board or election by the Membership)

From conversations with industry colleagues, the motivation of young members from industry are often to enhance connections as much as possible (thereby bringing visibility to their products and learning as much as possible about advances in their fields and the evolving needs of their customers). Attendance at society annual meetings can sometimes be a luxury, as opposed to a necessity, and attending a meeting without giving a presentation may be seen as not worth the time and expense. The future of the society depends on individuals who engage in the society, contribute to its success, and ultimately become the kind of individuals who make future young scientists refer to the CRS as “My Society.”

These factors, collectively, stood as the impetus for a change in the Society that I proposed to the Board of Directors in 2017. I was originally recruited by (then Member-at-Large and now President-Elect),

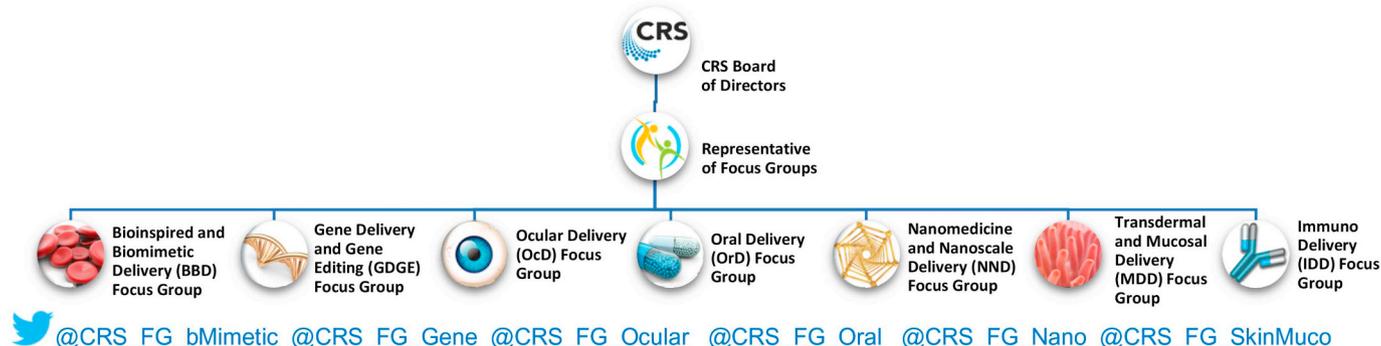
Justin Hanes who felt that a change was needed, and my proposal was facilitated and championed internally on the Board by (then President-Elect and now President) María José Alonso together with Justin Hanes. The question posed was basically: “What if younger academic and industry members were provided with increased numbers of opportunities to present their work, enhanced networking activity, the potential to be selected for high visibility awards, high visibility leadership positions, and even training in how to become a better leader through the direct ties to the Director of Focus Groups and the Board of Directors themselves?” This hypothesis, as presented, was that the Focus Groups would provide a bottom-up approach to creating well trained, future leaders of the Society that are celebrated and want to actively contribute to the well-being of the CRS as a whole. Any member can now more easily contribute to scientific programming. Any member can be elected to a leadership position, regardless of their career progress. Any member can win an award in any given year. In addition, this activity would result in an opportunity (and need) for senior members of the CRS to contribute by mentoring the junior focus group leaders, engaging in and championing the focus groups to the entire society, delivering session “keynotes” for the Focus Groups at the CRS Annual Meeting, and much more. This would be a win-win for every member in the Controlled Release Society that engages with the Focus Groups. This proposal was warmly received by the Board of Directors and supported strongly by (then President and now President-Emeritus) Tamara Minko, paving the way for the beginning of the Focus Group initiative.

4. My experience in similar initiatives

The idea behind the organizational structure proposed above has been implemented successfully in other scientific societies. The best example in my experience is in the Society for Biomaterials (SFB), which is also most often a “2nd” or “3rd” Society for most of its members. Nonetheless, many young investigators are drawn to the Society for Biomaterials because they provided opportunities to engage in “Special Interest Groups,” or “SIGs”. The SIGs were started in 1991 by Professor Buddy Ratner. Today, there are 14 SIGs in the SFB, which serve groups of members with shared interests in a way similar to that described above for CRS Focus Groups. In the SFB, the interest can be scientifically-oriented or not; the key to a SIG is that the common interest unites people and advances their careers. The SIGs hold face-to-face meetings at SFB Annual Meetings, where individuals can develop relationships and discuss their common interests. The SIGs are also the point of submission (and drumming up submissions) of most of the scientific content at the SFB annual meeting. The SIGs use their annual budget, which originates from \$10 of the annual membership fees for each member of the Society, to organize social functions, provide poster awards and travel grants, and more. SFB SIGs communicate (via newsletters and email) with the membership in a way that is not possible without them, thereby creating a communication delegation structure that engages the membership of the Society on a frequent and personal basis. The SIGs are managed on a week-to-week basis by an elected Board including a Chair, Vice-Chair, Secretary/Treasurer, Programming Chair, and Industry Chair (as industry members are under-represented in the Society). Each elected Board Member has a delineated responsibility and is a “champion” for success in that area of responsibility. Election to a SIG Board position provides enhanced visibility and networking and is an honor that serves as evidence of leadership in the scientific community for young investigators at promotion points. As a result, the highest quality young investigators vie to serve SFB SIGs, as they provide an opportunity to grow, to contribute, and to be recognized. This model has secured the loyalty of many rising young stars who see the SFB as aligned with, and strongly fostering, their career development. The Society also has benefited from the implementation of SIGs in numerous ways, including retaining and fostering the growth of its own leaders, many of whom ultimately run for

elected positions on the Board of Directors. SIGs have played a significant role in increasing the number of young investigators who call the SFB, “My Society”.

me the most when I was Chair of a SIG: opportunities to prove my ability to lead and to build something of value, to gain visibility and recognition for my efforts, and to learn how to become a better leader.



Focus Groups in the CRS as of January 2019, along with a representation of the organizational structure.

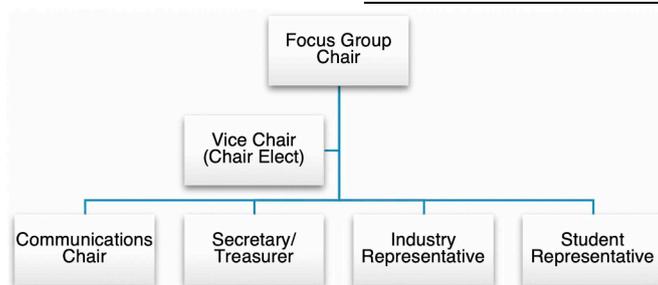
I served for a total of 6 years in the leadership of the SIGs in the Society for Biomaterials and was ultimately elected by the Chairs of the SIGs to become their Representative on the Board of Directors of the Society (from 2013 to 2015). I am proud to say that under my term on the Board, the SIGs went from an optional benefit, to a mainstream member benefit, with every member choosing a home SIG upon joining the Society or paying their annual dues. This has expanded the impact of the SIGs in the SFB by growing their annual budgets and pool of members. Communications also expanded through the widespread distribution of activities by SIG Chairs, creation of social media accounts, and the SIGnal newsletter (several examples of which are attached) to the entire membership of the Society each month. Incentives were also created, where impactful activity was reported to the Board of Directors at each meeting, with credit being given to the leaders of the SIG. In addition, an accountability structure was created, where each SIG Chair was responsible for reporting activity in quarterly Chairs Meetings (conference calls). Indeed, today, becoming a Chair of the Board of a SIG in the SFB is a highly visible and highly impactful service opportunity, and elections for these positions has become competitive.

During my time leading the SIGs, I observed that leadership was the single most important factor to the vitality of a SIG. When the Chair of a SIG was motivated and took their role seriously, the SIG would thrive. When that Chair stepped down and was replaced by an individual who was not diligent or motivated, the SIG would wilt. Thus, the accountability and incentive structures that was put into place was critical to minimize the perturbations in quality leadership. Indeed, young investigators are torn in so many directions, including: committee work, teaching, mentoring students, writing and reviewing grants and journal manuscripts, service to scientific societies, creation of intellectual property and patents, creation of startup companies, service on task forces and boards of directors, and attempting to create a level of balance in their life with family, hobbies, philanthropy and charitable activities. Some young investigators may even serve in academic leadership/administrative positions (e.g. Department Chair or Center Director). It is only natural, then, that regular reminders and renewals of commitment to a post, such as the leadership of a SIG (or Focus Group), are necessary and even welcomed. My focus to motivate SIG Chairs was always centered around providing to them what motivated

In the absence of continuous motivation and accountability, ambitious initiatives often shine bright for a short period of time, but then fizzle out without reaching, nor sustaining, their full potential impact.

5. The structure of the focus groups in the Controlled Release Society

Accordingly, the proposed organizational structure of the Focus Groups was designed based upon lessons learned in my time leading the SIGs. As with the SFB, the individual who manages the Chairs of the Focus Groups must have an elected position on the Board of Directors of the CRS or hold an official board observer's position with a title akin to “Representative for Focus Groups for the Board of Directors”. This Board-appointed leader reports directly to the Board of Directors and is held accountable by the Board for continuous value production to the membership of the Society. The Chairs of the Focus Groups report directly to this Board-appointed individual, through regular communication. From my experience, scheduled, monthly communication is effective, although informal communication is typically much more frequent. These interactions must provide the Focus Group Chairs with support to fulfill the shared vision of the Board of Directors and the Focus Group Representative, accountability on a regular basis, and ample opportunity for growth and recognition. Focus Group Chairs must actively manage a reliable and responsive Board of Directors, including (but not limited to): a Vice Chair (who serves as the Chair-Elect over a 2 year term), a Communications Chair (managing newsletter, email, and social media communication to members), a Secretary-Treasurer, an Industry Representative (in the case where industry members would be in the minority) or an Academic Representative (in the case where academic members would be in the minority), and a Student Representative. Other officers are encouraged, as necessary, to accomplish the goals of the Chair of the Focus Group Board, with each officer being responsible for reporting, on a quarterly basis, on progress and impact in an area that is representative of their role. Each of the positions (after a 2-year period) are subject to replacement by election of the membership of the Focus Group (except for the Chair, who is incumbent from the Vice Chair position).



Example leadership structure within a CRS Focus Group. Each position is elected from the membership of the Focus Group on a biannual basis, except for the Focus Group Chair, which gains experience for 2 years in leadership of the Focus Group as Chair Elect before assuming the role of Chair.

6. The inaugural year of the re-envisioned focus groups in the CRS

In the 2018 Annual Meeting in New York, NY, there were 5 inaugural Focus Groups: Biomimetic and Bioinspired Delivery (BBD, Chaired by Zhen Gu from the University of California, Los Angeles), Gene Delivery and Gene Editing (GDGE, Chaired by Daniel Siegwart from UT Southwestern), Nanomedicine and Nanoscale Delivery (NND, Chaired by Bruno Sarmento from the University of Porto), Ocular Delivery (OcD, Chaired by Morgan Fedorchak from the University of Pittsburgh), and Oral Delivery (OrD, Chaired by Katie Whitehead from Carnegie Mellon University). Just taking into account the Chairs and Vice Chairs, the Focus Group leadership originally represented 10 Universities across 5 Countries throughout the world. CRS Members were allowed to register as a member of as many Focus Groups as they liked in 2018, free of charge. Leading up to the annual meeting in New York, several established CRS leaders stepped forward to “champion” the Focus Groups. These CRS leaders each sent a message to the Society’s membership to explain why they were becoming member of the Focus Group. Focus Group Champions in 2018 were Nicholas Peppas from the University of Texas, Austin (BBD), Ernst Wagner from Ludwig-Maximilian’s University of Munich (GDGE), Molly Stevens from Imperial College, London (NND), Mark Prausnitz from the Georgia Institute of Technology (OcD), and Kinam Park from Purdue University (OrD). Notably, upon sending these testimonials, membership in the Focus Groups more than doubled, which is a testimony to the reputation that each Champion has in their respective fields. Each Champion was also present at the inaugural membership meeting of their respective Focus Group, of which was held at 7 am on Monday morning of the annual meeting. Attendance was high at these membership meetings despite the early starting time, and included new members looking for more information on what the Focus Groups have to offer them. Some of these new members have already been elected to leadership positions on the Board of Directors of these Focus Groups. Several other CRS leaders were invited to give inaugural “keynote” lectures in the Focus Group sessions at the CRS annual meeting, including Samir Mitragotri from Harvard University (BBD), Daniel Anderson from the Massachusetts Institute of Technology (GDGE), Dan Peer from Tel Aviv University (NND), Uday Kompella from the University of Colorado, Denver (OcD), and Randy Mrsny from the University of Bath (OrD). In these sessions, rooms intended to seat 125 people were standing-room-only, with up to 180 people in attendance at any time. The inaugural Focus Group Awards were also given out (presented personally by the Focus Group Champions), including: the BBD Young Investigator Award to Avi Schroeder from the Technion and the BBD Trainee Award to Gayong Shim from Seoul National University, the GDGE Young Investigator Award to Natalie Artzi from Brigham and Women’s Hospital, Harvard Medical School and the GDGE Trainee Award to Hong-Xia Wang from Columbia University, the NND Young Investigator Award to Daniel Heller from the Memorial Sloan Kettering Cancer Center and the NND Trainee Award to Lei Wu from Sichuan University,

the OcD Trainee Award to Frances Lasowski from McMaster University, and the OrD Young Investigator Award to Jill Steinback-Rankins from the University of Louisville and the OrD Trainee Award to Maria Garcia-Diaz from the Barcelona Institute of Science and Technology.

7. The focus groups today

There are currently 7 Focus Groups in the Controlled Release Society, of which two are new for 2019: the Transdermal and Mucosal Delivery Focus Group (TMD), Chaired by Emmanuel Ho from the University of Waterloo with Olivia Merkel from the Ludwig-Maximilian University of Munich serving as the Vice Chair, and the Immuno Delivery Focus Group (ID), Chaired by Ankur Singh from Cornell University with James Moon from the University of Michigan serving as the Vice Chair. María José Alonso (University of Santiago de Compostela) and Krishnendu Roy (Georgia Institute of Technology) served as the inaugural champions in 2019 for the TMD and ID Focus Groups, respectively. Following the 2019 Annual Meeting of the CRS in Valencia, Spain, the Vice Chairs of the 5 pre-existing Focus Groups will step into the role of Chair for a two-year term: Zhuang Liu from Soochow University (BBD), Gaurav Sahay from Oregon State University (GDGE), Hélder Santos from the University of Helsinki (NND), Thakur Singh from Queen’s University Belfast (OcD), Aaron Anselmo from the University of North Carolina, Chapel Hill (OrD).

It is also foreseeable in the future that Focus Groups would draw people together not based solely on a shared sub-field interest, but also on the basis of supporting and enriching diversity, educational initiatives, political advocacy for delivery science, and more. The potential number of groups formed may be limited by three factors: the popularity of each topical area amongst a constituency of the society membership, the availability of space/time for programming at the annual meeting, and/or the availability of sufficient financial support to allow the groups to provide value to CRS members.

The CRS Board is currently considering the most appropriate method to select new Focus Groups going forward. As it stands today, the CRS Board of Directors continues to cover the cost of membership for all CRS members for all 7 Focus Groups during the startup period, which remains a tremendous benefit of membership in the Society.

8. The future of focus groups in the CRS

The possibilities for bottom-up engagement in the CRS through Focus Groups are only limited by the imaginations of every single member of the Society that chooses to create/elaborate/formulate/devise them. I predict that most of the members of our future CRS Board of Directors will be people who have already proven themselves through leadership in the Focus Groups. It is also likely that the valuable leadership experience gained through the CRS Focus Groups will prepare many CRS members for other leadership positions in industry, government and academia. I also see tremendous potential for engagement

of members year-round, outside of the confines of the Annual Meeting. For example, multiple webinars with industry and academic speakers (which were free of charge for Focus Group members) have already taken place in 2018 and 2019. Additional massive-online conference calls that allow members to hear about a new topic and learn from leaders in their respective fields from all over the world have been proposed. CRS Focus Group social media accounts have already collectively exceeded 1000 followers on Twitter, and their following is growing at a surprising rate. Focus Group Communication Chairs will be using social media platforms to not only inform followers of emerging science on a weekly (and sometimes daily) basis, but also to announce publications and awards received by the members of that focus group. This will provide a platform for members to be recognized that did not exist prior to the establishment of the Focus Groups. I envision that the Focus Groups will one day establish scientific meetings under the CRS umbrella, bringing scientists from a region, a country, or from all over the world to an annual meeting focused on the field of interest/study of that Focus Group. I also foresee possibilities for Focus Groups to partner with Venture Capital and Industry to articulate problems and solicit solutions through competitions and grand funding opportunities that were previously unavailable to members of the CRS. I envision that Focus Groups will establish mentor-mentee relationships that provide

valuable information beyond scientific topics to include things like grant writing, tips for establishing a new laboratory and managing one's work environment, and even work-life balance. Ultimately, I see the Focus Groups contributing to the celebration of excellence in CRS Science, training of our next generation of leaders, providing a way for every member of the CRS to have a say in the direction of the Society, and promoting scholarship and leadership in our great field of Controlled Release.

Acknowledgments

I would like to thank Michael Gallery and Gabrielle Copperwheat from the CRS for their extremely helpful thoughts and comments. It is also important to recognize María José Alonso (current President), Tamara Minko (Past-President), and Justin Hanes (President-Elect) as well as the other Board of Directors of the CRS including Yvonne Perrie (Secretary), Samir Mitragotri (Treasurer), David Putnam (Treasurer-Elect), Richard Korsmeyer (Director-at-Large), Mark Prausnitz (Director-at-Large), Iva Rupenthal (Director-at-Large), and Twan Lammers (Director-at-Large) for their tremendous support in the formation of the Focus Groups.