Not all of these interventions worked, but by using our Quantified Correlated Impacts Evaluation framework we were able to weed out the struggling projects and invest more in those which returned sustainable new businesses with great potential. As predicted, as soon as new companies supported by the right tools entered the knowledge network, their success was inevitable.

"I reply to Thor: 'Sure.' 'Unlocking the pressure passage,' he responds. I step outside. The sky is pale blue due to the thin, carefully constructed layer of atmosphere, and the warm shimmering white light from the Sun is rising from behind the silvery hills. Who would have thought 50 years ago that being here, living here was possible? But possible it is – as soon as humanity started to leave in peace and harmony, pulling together resources and expertise previously used to fight each other, this became a very small step indeed."

"As small as the one I make through the door of the compound, filling my lungs with clean morning air. I start to run, ready for another day of my future – living on the Moon in 2065."

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His main area of research is acceleration of business incubation and development of Space Sector in the UK, and in Scotland, and he has a specific interest in advancing the field of astrosociology, including being an Assistant Editor of *The Journal of Astrosociology*.

HONEY, I SHRUNK THE SPACE SETTLEMENT! Dunbar's Number & Radical Politics in Space

When one thinks about human space settlements, one most likely imagines enormous space cities that look like spinning American suburbs complete with clean roads, luscious parks, and baseball diamonds. During the 1970s, NASA Ames Research Center sponsored studies on massive space settlements that could theoretically hold 10,000 to 1,000,000 people [1]. Artists began to illustrate the concepts dreamed up by NASA engineers, which permeated into the social imaginary of space advocates.

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While these enormous structures – with names like *Torus Colony* and *Bernal Sphere* – spark the creativity and engage with the dreams of many space advocates and science fiction fans alike, I have asked myself: are these gigantic settlements really the most harmonious way of living in space and other planets?

Bernal Sphere Illustration. Art work by Rick Guidice.
Image: NASA Ames Research Center.

In 1992, Robin Dunbar, a British anthropologist and psychologist, theorized a cognitive limit to the number of people with whom humans can have a stable social relationship (i.e. relationships in which an individual knows who each person is and how each person relates to every other person) [2]. Although he never named an exact integer – he suggested it was between 100-230 – the common number that is accepted today is 150. This is now referred to as "Dunbar's number." A

recent study analyzing the conversations of Twitter users has shown that users can entertain a maximum of 100-200 stable

relationships, seeming to confirm Dunbar's theory [3]. Could this be a contributing factor in why many residents of enormous cities like New York and Los Angeles report loneliness and alienation? Do we want to extend this kind of alienation – and potential conflict – into a resource-deprived and potentially dangerous environment of space?

Instead of always thinking about living in massive Torus Colonies or Bernal Spheres, we should begin to think about the possibility of living in a network of smaller settlements utilizing Dunbar's number. Living within Dunbar's number would combat apathy and strengthen the sense of community because it would maximize the limits of the strong ties of which human beings are capable. Creating smaller communities would also allow for a radically democratic system of (anti-) governance to flourish. Rather than utilizing the increasingly corrupt system of Earthling electoral politics, decentralized space "pods" (for lack of a better name) would be able to utilize an anarchic, consensus-based model of decision making. While it is possible to engage with anarchist models of power in large populations, it is easier and quicker to make group decisions when you are in a space settlement limited to 200 people.

However, this does not mean that these small, anarchist space pods need to roam the cosmos

Honey, I Shrunk the Space Settlement . . . (cont.)

as isolated communities. Current anthropological research has shown that although humans may be restricted to 100-200 strong ties, they are capable of utilizing thousands of weak ties in order to accomplish tasks [4]. A decentralized network of these pods would be able to interact with each other in order to accomplish larger scale, communal projects as well as respond to emergencies while still maintaining autonomy. This may seem like the realm of science fiction alone, but we can see a version of this system working today in northern Syria by the Kurds. Working from the political theories of Abdullah Öcalan [5], directly recallable delegates are scaled to represent neighborhoods, cities, and regions in order to make consensus-based decisions with tens of thousands of people.

Illustration of a Torus Colony. Image: NASA Ames Research Center.

The dream of living in space consists of more than romantic notions of exploration and a human “need” to wander. The dream of space habitation is about freedom. And not the flag-waving, nationalistic, earthly bastardizations of freedom; I’m talking about true freedom. The ability to live, to sing, to create art, to write, to love, to build wondrous things, to read, and to share the beauty of the cosmos with the people that you care about. It is becoming harder and harder to engage with these vital human needs on Earth today. Do we really want to continue the status quo in the cosmos or can we dream of something better?

Notes

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2. Dunbar, R. I. M. 1992. “Neocortex Size as a Constraint on Group Size in Primates.” *Journal of Human Evolution* 22 (6): 469–93. doi:10.1016/0047-2484(92)90081-J.

3. Gonçalves, Bruno, Nicola Perra, and Alessandro Vespignani. 2011. "Modeling Users' Activity on Twitter Networks: Validation of Dunbar's Number." *PLOS ONE* 6 (8): e22656.
4. Shaindlin, Andy. 2016. "Dunbar's Number & the Strength of Weak Ties." Alumni Futures. Accessed April 1. <http://www.alumnifutures.com/2007/08/dunbars-number-.html>
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Notes from the CEO

Jim Pass, PhD

Chief Executive
Officer

Astrosociology
Research
Institute

2016 is a busy year for ARI. We are working on the second volume of *The Journal of Astrosociology* and starting the editing process of our book, *Launching Astrosociology*. Our other projects and programs are also moving forward. Even now, we have also started discussions for preparations for the tenth anniversary of the establishment of the Astrosociology Research Institute. Look for announcements as that year draws closer.

My attendance at the Contact Conference (www.contact-conference.org) was highly informative and enjoyable. Many of the attendees are well known and celebrities in the space community, yet they are all approachable to everyone in attendance. If you check my Twitter account (@astrosociology) coverage of the Contact Conference between April 1 and April 3, you will find an extremely diverse collection of presenters over those three days. They include social scientists, space scientists of various types including astrobiologists and astronomers, science fiction

authors, movie experts, and others. Each of their names, photos, and presentation topics are in the timeline. I certainly encourage everyone to strongly consider attending – and presenting at – the next meeting in 2018. You will not be disappointed! Students, I have no doubt that you will especially learn a lot and enjoy yourselves.

Space Societies (and Smaller Space Settlements)

I would like to take this opportunity to discuss a few issues regarding space societies. It is not too early to take migration into our solar system seriously. The Astrosociology Research Institute is currently seeking social scientists, humanists, and artists interested in pursuing astrosociology to join the growing astrosociology community regarding space settlements and other relevant