

ALCOR LIFE EXTENSION FOUNDATION

# CRYONICS

SEPTEMBER-OCTOBER 2012 • VOLUME 33:5

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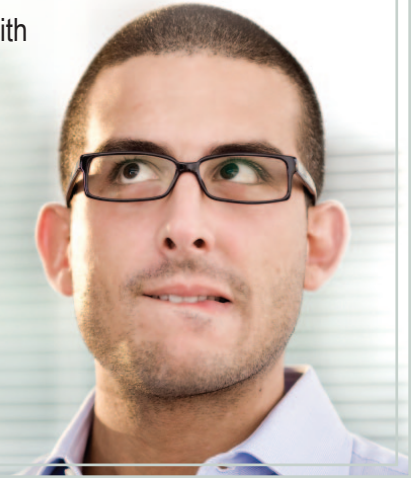
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# ALCOR LIFE EXTENSION FOUNDATION CRYONICS



## COVER STORY: PAGE 17

**Alcor 40th Anniversary Conference**  
Alcor is celebrating its 40th Anniversary at this conference! This issue of *Cryonics* magazine features the complete program, information about the talks and speakers, and registration information. Do not miss this once in a lifetime event. Topics of discussion include advances in cryopreservation, strategies to defeat aging, brain scanning, financial planning for the future, and medical monitoring devices for cryonists. Existing Alcor members and Alcor Associate members pay a reduced conference registration fee.

## 6 CEO Update

Alcor President Max More writes about the upcoming Alcor conference, new research at Alcor aimed at validating "field vitrification" for overseas members, a recent last minute case, and ongoing improvements at Alcor.

## 8 Symposium on Cryonics and Brain-Threatening Disorders

On Saturday, July 7, 2012, around 30 people attended the first ever symposium on dementia and cryonics in Portland, Oregon. Ben Best, who attended the event and was one of the presenters, provides a detailed account of the symposium about this important but discomforting topic. Also present was Alcor CEO Max More who spoke about the concept of the "extended mind" and its implications for personal survival and neurodegenerative diseases.

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Quod incepimus conficiemus (Latin: 'What we have begun we shall finish') is a new column by *Cryonics* magazine editor Aschwin de Wolf that aims to further the cause of human cryopreservation by debunking misconceptions and offering fresh perspectives. The first column discusses why perfect cryopreservation is not necessary for successful resuscitation of cryonics patients.

### 12 Book Review: *Connectome: How the Brain's Wiring Makes Us Who We Are*

Sebastian Seung's recent book, *Connectome: How the Brain's Wiring Makes Us Who We Are*, presents a perspective on the brain and identity that will resonate with advocates of cryonics. We are publishing two reviews of this important book which reflect different perspectives on the aim of cryonics (medical treatment versus the conquest of death).

### 24 Membership Statistics



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Alcor provides a wide array of services for you the member, and the general public. We inform and educate, we protect and preserve, and we strive to remain at the forefront of cryonics technology.

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## The James Bedford Society



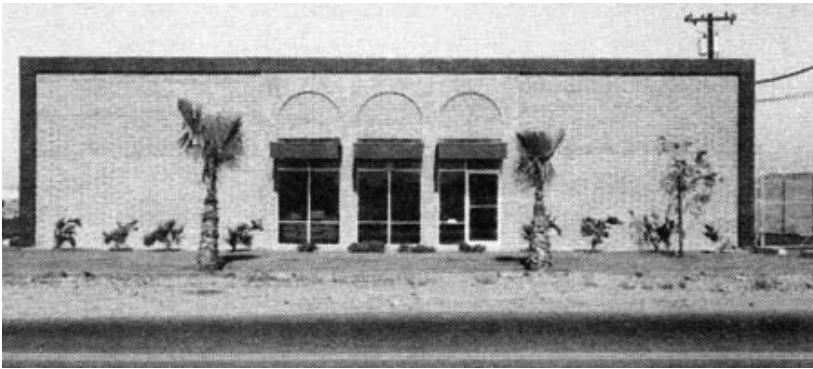
Gifts have played a fundamental role in the cryonics movement since its earliest days. Dr. James Bedford, a man whose extraordinary vision led him to become the first person to be cryopreserved, and the first to make a bequest to a cryonics organization, exemplified the determination of the early pioneers of cryonics. We invite you to follow in his footsteps, and join the James Bedford Society.

The James Bedford Society recognizes those who make a bequest of any size to the Alcor Life Extension Foundation. If you have already provided a gift for Alcor in your estate, please send a copy of your relevant documents to Alcor's Member Communications Director, Lisa Shock.

If you'd like to learn more about setting up a bequest, send an email to [lisa@alcor.org](mailto:lisa@alcor.org) or call 877-462-5267 x115 to discuss your gift. ■



# QUOD INCEPIMUS CONFICIEMUS



## PRESERVING AND INFERRING

By Aschwin de Wolf

A common complaint against cryonics is that existing cryopreservation technologies may not be good enough to preserve the ultrastructure of the human brain. Advocates of cryonics often object that such views do not reflect actual inspection of the evidence of cryopreserved brains but instead reflect misconceptions about “freezing” and ice formation rupturing cells. But the more fundamental misconception rests on the view that for cryonics to work flawless preservation of the brain is absolutely essential.

This view is not only mistaken but holds cryonics to higher standards than those applied in conventional medicine. In medicine it is routine for patients to present themselves with conditions in which an organ or tissue has been changed from its normal condition (or appearance) as a result of disease or trauma. Restoring normal structure or function is the essence of most medical treatments.

One might object that in the case of cryonics we are concerned with the brain, which distinguishes itself from other organs that encodes highly individual information. If a portion of the brain is erased we cannot consult another brain or medical textbook to infer its original state. We can

admit that this is a valid observation but it is not necessarily a fatal argument against cryonics, provided the damage has not reached the point of complete destruction or indecipherability.

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*“Restoring normal structure or function is the essence of most medical treatments.”*

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There is a difference between damage and obliteration. If we look at electron micrographs of brain tissue produced at various points in time after circulatory arrest (“death”) we will observe progressive alterations of synapses, cell membranes, organelles etc. We describe such changes with a mental (or actual) map of how they normally look like in mind. At this level the fact that the brain is a highly individual organ is no longer relevant because we know the universal biochemical language in which this identity is written. At this point the real question becomes at which point is it not even possible to *infer* the original condition of the brain. As far as

we understand this today, this may be a question of many hours, if not days.

This robustness of identity-critical information in the brain may seem to contradict the routine observation in emergency medicine that there is a much narrower time limit for successful resuscitation from cardiac arrest. The crucial difference here is that we are no longer talking about the ability to infer identity-critical information but restore physiological *function*. But function is a lot more vulnerable to metabolic and biochemical changes than the wiring of the brain. In fact, if function were a necessary requirement to infer information a lot of existing forensic and archeological science would be impossible.

In approaching cryonics it is important to recognize the distinction between preserving and inferring. In this way we can better assess the prospects for resuscitating patients who were cryopreserved under nonideal conditions and/or with older technologies. ■

*Photo: Cryo-Care Equipment Corporation on Indian School Road in Phoenix, AZ. Dr. Bedford’s “home” from 1967 to 1969.*

# CEO Update

By Max More



Alcor's first conference in five years is just two months away as I write. The schedule of speakers and sessions is now filled, registration is open, and the conference webpages are online. We already have over 80 people registered – a quarter of them non-members – a good number considering how many put off registering until the last couple of weeks.

My aim in selecting speakers and sessions is to maintain a practical and science-based concentration on topics of clear relevance to cryonics and life extension. That's why we will be hearing updates on cryopreservation research from Greg Fahy and from Chana and Aschwin de Wolf. We will hear three distinct perspectives on anti-aging theory and practice, concluding with a discussion between the three speakers (Aubrey de Grey, Michael Rose, and Joshua Mitteldorf).

The practical aspect of the conference is especially reflected in the panel on long-term financial planning, another panel on the use of medical monitoring devices for members of cryonics organizations, my talk on improving your chances of an optimal cryopreservation, and an update from Suspended Animation. We will also use the conference as an opportunity to both help people enter the sign-up process and to complete their sign-up tasks by holding Sign-Up Salons on Saturday and Sunday.

I'm especially pleased that our invitation to speak was accepted by MIT professor Sebastian Seung, author of *Connectome: How the Brain's Wiring Makes Us Who We Are*, a book that includes a discussion of testing the viability of cryonics and other preservation methods (see the two reviews of the book in this magazine). Seung's talk

will be especially timely given the declined contribution from the Alcor Research Fund to the Brain Preservation Prize – for which Seung is a judge. Another approach to empirically testing the results of cryopreservation will be presented by Todd Huffman, who will explain his diamond knife-edged scanning microscopy (KESM) work.

We have also put together a sponsorship package (with thanks to input from Barry Aarons) and will be seeking sponsors to help cover expenses, allowing us to keep registration rates affordable (and lower than comparable conferences, including Alcor's previous two). Publicity for the event is now going into high gear. Any suggestions for venues in which to publicize the event would be very welcome.

## Research and the Proposed Overseas Protocol

Alcor members are not limited to the United States. Back in 1986, recognizing the difficulties for Alcor in responding quickly and effectively overseas at a distance of 6,000 miles, a few friends and I accepted the challenge of starting a UK-based organization (that became Alcor-UK). For many years, Alcor has attempted to achieve rapid cooling and movement of the patient for international members. The distance involved has typically meant, in practice, extensive periods of warm and cold ischemia. Sometimes cryoprotective perfusion is attempted but in many cases this is contraindicated and the patient receives a "straight freeze." Even if some cryoprotective perfusion is possible, prolonged ischemia produces substantial edema, perfusion impairment, and ice formation.

Perhaps because I came from England, both discouraging overseas membership and the straight-freeze approach have struck me as unacceptable. But how can we possibly apply Alcor's closed circuit M22 protocol in the field at such distances to achieve vitrification? Research fellow and 30-year Alcor veteran Hugh Hixon urged us to consider using a simplified open-circuit procedure for introducing the vitrification agent, M22. This avoids using an advanced perfusion circuit and we also relaxed the requirement for perfusion at subzero temperatures for the final part of the procedure. Although this may not be the "gold standard" procedure for Alcor, Alcor's scientists and consultants expect such a protocol to be superior to prolonged cold ischemia and the prospect of a straight freeze.

The core idea is to conduct cryoprotectant perfusion on-site and ship the patient in dry ice to Alcor, rather than washout with MHP-2 organ preservation solution. At around -78 degrees Celsius, dry ice is much colder than the water ice used in a straight freeze, and buys us significant time for the transport. We have tested the neuro shipping box, maintaining dry ice temperature for six days. This should be plenty of time to allow for delays due to canceled flights or bureaucracy, while short enough to mean insignificant damage to the patient.

The modified protocol seemed to make good sense, but hypothesis and reality often diverge. To experimentally corroborate the use of remote open circuit M22 perfusion and dry ice shipping, Alcor and Advanced Neural Biosciences have conducted a number of exploratory experiments. ANB's initial research results have been so promising and cost-effective

that we intend to extend the studies. The first round of experiments validates the proposed open-circuit protocol. The results support the notion that avoiding ischemia is extremely important, and that it is crucial to rapidly cool down and wash out the patient to protect against prolonged cold circulatory arrest. The experiments also appear to support the practice of timely heparin administration.

### Alcor's 112th Patient

On Friday, July 20th, Alcor was notified through the TeleMed alert system that a 90-year-old individual wishing to be cryopreserved was in serious condition in a Las Vegas hospital. This person had filled out an application for membership in 2009 (and was provisionally assigned the number A-2628) but never followed through with the necessary paperwork and funding. Since he became unable to make cryonics arrangements, this case had to be treated as a third-party arrangement. Because this he requested privacy, I will refer to him by his A number.

Because of the greater risk involved, Alcor requires additional conditions to be met before accepting such a case. These conditions are rarely met. These include some past interest in cryonics on the part of the person for whom cryopreservation is sought; lack of opposition by close relatives; finances in place without undue hardship; no long ischemic time; and informed consent of persons making the arrangement. This case was one of the rare ones to proceed, in large part due to the determined efforts of A-2628's granddaughter supported by the family accountant.

Over the weekend of July 21-22 Aaron and I pushed hard to get more information on his medical condition, to get all necessary Third-Party sign-up documents signed, and to secure payment – all conditions necessary before we could go into action. The grandfather's health declined rapidly, while we ran into administrative delays common at the weekend. Although his clinical death occurred on July 23rd, a day prior to completing the sign-up process, arrangements were made to have his body heparinized and cooled at a local mortuary until his membership status could be approved.

Once the necessary arrangements had been completed, Aaron flew to Las Vegas

and arrived approximately 22 hours after clinical death to complete the medication administration, create a more aggressive cooling environment and package the body for flight. An air ambulance was paid for by the family to minimize the travel time and the patient arrived at Alcor for washout and cryoprotection within the next six hours. Several Alcor staff stayed through the night of July 24/25 until A-2628 had been perfused as well as possible given his condition, and dropped below the freezing point.

This case vividly illustrates the danger of postponing making arrangements for cryopreservation until you expect to need it. When the person in question is in his late 80s (and has no shortage of funds), it's especially baffling that he wouldn't complete arrangement in advance, simply to save a few years of membership dues. It's much easier to understand why someone in their 20s might delay making arrangements. But you're still playing the odds. As I write this, there is much discussion on a plea posted on the social news website Reddit by a 23-year-old woman with terminal brain cancer who has clearly expressed her wish to be cryopreserved.

### Feedback and Improvements

As part of the project to collect more detailed and informative feedback on our core procedures, I authorized new HD video cams, chosen by Steve Graber, now situated in the operating room. (These are distinct from the new security camera system.) One Blu-Ray quality camera sits in the corner, showing a wide field of view of activity in the OR. Another HD camera is attached to the surgical light, recording the surgery close-up. Viewing the results from our recent case, Steve found that the sound recording is far from optimal due to the noise generated by the chiller. We will next be looking into reducing the noise level.

Further improvements in feedback would result from doing biopsies, both from spinal cord and brain. I need an expert group to advise how to proceed with this and to create the procedures. None of this will be implemented without board review. My aim is to ask all members for their explicit permission for these biopsies at the same time as requesting permission (from neuro members) to do CT scans.

### Resilience

We should improve both the quality and security of our record-keeping. We are about to embark on a major project of scanning all the files kept in the file room, most crucially all files on Alcor's patients. Ensuring that Red Books (which record details of each patient's medical history and cryopreservation) are kept routinely and fully is not enough. The paper files are relatively vulnerable. After scanning the files, we will back them up in digital format with password protection. We have just greatly expanded Alcor's server storage capacity, but files can (with full security precautions) also be backed up off-site.

We like to explain to visitors and press that Alcor's patients do not depend on an uninterrupted electricity supply for their continued preservation. Loss of power is, however, a serious concern in the operating room. We are now working on a backup power supply for the OR by installing the equipment needed to connect core OR equipment to the backup generators. We also have concerns about the adequacy of our existing refrigeration space. We would like to be able to store more perfusate, but this will require additional refrigeration units.

Media and Tours: A fair bit of media activity this month. This included answering questions and correcting mistakes in a fact check for Discover Magazine on Sebastian Seung's book. The results will appear in an article due out in October. On July 12, I did an interview with the UK's Metro. On July 13, I was interviewed by the iRadio, Drivetime show in Ireland. On July 16, I was interviewed via Skype by Adam Ford on Alcor-40 conference. On July 17, I talked with Scottish art project producers. And on July 24 I talked extensively with a writer for GQ for a story that was originally to focus on James Bedford but whose scope has expanded.

For other activities not reported here, please see my monthly updates in Alcor News. (You are reading this regularly, yes?)

Finally, on a personal note, in August I moved out of my apartment and into a house in Scottsdale and have been joined at last by my wife, Natasha. The house is located just 1.9 miles away from Alcor – a drive of 3.5 to 4.5 minutes. This means that I can respond very quickly should my physical presence be required. ■





# SYMPOSIUM ON CRYONICS AND BRAIN-THREATENING DISORDERS

By Ben Best

**O**n Saturday, July 7, 2012, I attended the Symposium on Cryonics and Brain-Threatening Disorders in Portland, Oregon. The symposium was the “brain child” of Aschwin de Wolf, who also kindly invited me to give a presentation on treatments to mitigate Alzheimer’s Disease (AD). The symposium was organized by the Institute for Evidence-Based Cryonics and Cryonics Northwest.

It has been said that cryonics arrangements are made by people who think about things other people would rather not think about – in this case, one’s personal mortality. Like the sun in the sky, we can be aware of its presence, but prefer not to look at it. Dementia is in the same category. Despite the fact that anyone who lives long enough (cryonicists are usually life-extensionists) is much more likely than not to get dementia, even cryonicists are often reluctant to plan for becoming demented. Aschwin deserves a lot of credit for not only being a cryonicist, but for organizing (with his wife Chana) the world’s first symposium/conference dealing with the subject of cryonics and dementia. It is all the more impressive because Aschwin is a man in his 30s.

The symposium required no registration, registration fee, or notification of attendance. One man attended because another attendee had informed his wife of the event while on an airplane to Portland. There were only about 30 people at the event, but the quality of the attendees and presenters was very high. The event was held at Kaos Softwear, a manufacturing company where Chana is a manager. All the talks were allotted one full hour.

Chana, who has a master’s degree in neuroscience, was the first presenter. Her topic was neurogenesis – the creation of

new neurons. Although neurogenesis was discovered in 1965, because neurons are post-mitotic (are non-dividing cells), the discovery was viewed with skepticism until the discovery of neural stem cells in 1992. Neurogenesis only occurs in two discrete areas of the mammalian brain: in the olfactory system and in the hippocampus. The latter is more crucial, although the exclusion of the cerebral cortex is of great concern insofar as that is the probable location of memory, identity, and decision-making. The hippocampus prepares new memories for long-term storage in the cerebral cortex. Chana asked lots of questions for which there are yet no answers. Why does the hippocampus need to create new neurons in the creation of new memories? How is neurogenesis used? How is neurogenesis regulated? Neurogenesis declines with age, and is enhanced with exercise or ischemia. Ultimately, endogenous neurogenesis does not appear to hold much promise as a repair strategy for AD or other forms of dementia. However, it is a worthwhile endeavor to understand neurogenesis in order to guide our own attempts at neuronal repair and/or replacement.

Aubrey de Grey began his talk by acknowledging that none of the work being funded in the 2012 \$4.5 million budget of his SENS (Strategies for Engineered Negligible Senescence) Foundation is focused on repairing the brain, although there is a project determining the rate of accumulation of epimutations, that is not focused on repair. He spent the first half-hour reviewing the SENS program, and the next 15 minutes explaining why 3 of the 7 SENS strategies are particularly applicable to dementia: (1) Neurofibrillary

tangles and soluble amyloid in Alzheimer’s disease (AD), and their counterparts in other neurodegenerative diseases, are intracellular junk, (2) amyloid plaque in AD is extracellular junk, and (3) late-stage neurodegeneration involves cell loss. Dr. de Grey said that intracellular junk shows signs of failed autophagy. He said that most of the intracellular junk in dementia is protein. It should be easier to dispose of than the cholesterol degradation products which are the focus of SENS lysosome work on atherosclerosis, but which are not properly delivered to the lysosome. He outlined the circumstantial evidence that the main problem may be the same as in atherosclerosis, i.e. oxidized cholesterol poisoning the lysosome. He spoke of the current clinical trials for having microglia eliminate extracellular junk (amyloid plaques). The first human clinical trials had shown great promise, but were halted because 5% of the patients developed brain inflammations. The newer trials have apparently corrected that problem. Aubrey noted the widespread belief that the amyloid would be removed without being of much benefit – expressing his belief that this misses the point, because major postponement or reversal of AD will require fixing all three main problems, hence lack of benefit from fixing one is not evidence that that one need not be fixed. I am one of the skeptics because follow-up autopsies on the first trials showed that even when amyloid plaques had been completely removed, no reduction in degeneration had occurred [THE LANCET; Holmes, C; 372:216 (2008)]. By the time AD is diagnosed, neurodegeneration is too far along to be helped by removing amyloid (though there is rapid progress in improving



very early diagnosis). Immunization to remove amyloid would be more effective if begun in the 20s or 30s, much like shots for measles or polio – as prevention rather than cure. Although amyloid may serve a positive function in repair or it would not have evolved. [Aubrey notes: who says it evolved? “Aging is a product of evolutionary neglect, not evolutionary intent” (Hayflick)]. Concerning cell loss, Aubrey was sanguine about Jean Hebert’s work exploiting the fact that certain neural progenitor cells are highly migratory, potentially facilitating widespread distribution of new neurons throughout the neocortex via stem cell therapies. Even if neurons can be replaced in the neocortex, I wonder how that would compensate for the loss of synaptic connections and strength of synaptic connections. Of the three approaches mentioned by Dr. de Grey, I would say that removal of intracellular junk has the best chance of being of benefit on its own, because it is the neurofibrillary tangles that tend to cause cell death rather than the amyloid plaques, which are an upstream event.

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*“Alzheimer’s patients nearly always die of infection, and because infection may also occur early in the disease, Mike Darwin recommended that anti-microbial treatment be refused by an Alzheimer’s victim as a way of hastening cryopreservation.”*

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My talk was basically a summary of the “Alzheimer’s Disease: Molecular Mechanisms” page in the life extension section of my website BENBEST.COM. I wrote the page in 2003 between leaving my job as bond database support for Scotiabank in Toronto, Canada, and becoming president of the Cryonics Institute in Michigan. For the subsequent 9 years I have become increasingly displeased about how out-dated the webpage was becoming. So I was pleased at the opportunity to



*The audience listens to a presentation by Alcor CEO Max More*

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do the massive research required to update that webpage for this symposium. Unfortunately, it was all I could do to finish the updating before catching my flight to Portland. Aschwin and Chana allowed me to crash at their condominium. I missed the Friday evening social for those attending the symposium because I spent all evening and a couple of hours the next morning creating my PowerPoint. I was pleased with the result, however, and pleased with the presentation I was able to deliver.

I encourage anyone interested in the content of my talk to consult my Alzheimer’s webpage because that page has detailed linkable references which I could not include in my presentation. I believe that the most promising therapy is the targeting of copper with PBT2, which removes copper from amyloid without chelating essential element metals. Etanercept, which antagonizes the inflammatory cytokine TNF-alpha has also shown promising results. Possibly also, passive immunization with tau antibodies would be of greater benefit in stopping neurodegeneration than immunological approaches against amyloid. Concerning prevention, exercise, curcumin, pomegranate juice, and folic supplementation have shown good results. Seemingly conflicting results would indicate that ginkgo biloba can slow cognitive decline in Alzheimer’s patients, but is of no benefit in preventing the disease.

Mike Perry’s topic was Early Detection of Alzheimer’s Disease. On that subject he reported that the CerebroSpinal Fluid (CSF) is low in amyloid beta and high in phosphorylated tau protein. I had put much more detail on this subject into the biomarkers section of my webpage on Alzheimer’s Disease – which I showed to Mike later in the day. In his presentation Mike noted even for people who do not get AD, dementia of some kind is still very probable with aging. He commented that AD is not a terminal illness, which is defined as an illness in which two physicians have certified that the patient probably has no more than six months left to live. No AD patient dies of AD – the cause of death is usually infection (pneumonia, bedsores, urinary tract infection, etc.). I expressed concern that suicide by VSED (Voluntary Stopping of Eating and Drinking, as Mike calls it) by an AD victim could lead to autopsy. Mike denied that this was necessarily the case. I was told that for anyone who had died by refusing food and water the cause of death would be obvious, and no autopsy would be required, though circumstances and policies will vary. Mike Darwin, however, noted that VSED could be harmful to the brain as cardiac arrest draws near, due to low respiration rates. Aschwin responded that this kind of brain damage is still relatively benign in comparison to the alternative

(advanced dementia). James Swayze, who is a paraplegic with cryonics arrangements and was in attendance at this event, has expressed concerns that dehydration causes brain damage. Dehydration may reduce brain functionality, but brain dehydration is a key process in removing water from the brain in the vitrification point of view and is probably a benefit rather than a harm for cryonics purposes. Alzheimer's patients nearly always die of infection, and because infection may also occur early in the disease, Mike Darwin recommended that anti-microbial treatment be refused by an Alzheimer's victim as a way of hastening cryopreservation. If infection does not occur early in the disease, however, refusing antibiotics may not produce the desired result.

Keegan Macintosh, who recently graduated from a Canadian law school, presented on the subject of Thomas Donaldson's 1988 lawsuit in California to be cryopreserved before his brain cancer destroyed too much of his brain to make cryonics a worthwhile effort. Keegan criticized the attorneys involved in the appeal for arguing that Donaldson's right to "premortem cryopreservation" stemmed from a constitutionally-protected right to assisted suicide, rather than the right to pursue a risky, but potentially life-saving procedure. By framing the case this way, the Court was able to avoid having to consider Donaldson's unique and crucially relevant motive, and thus the possibility of cryonics succeeding, for him or anyone else. Acknowledging, however, that options for assisted suicide could be of use to cryonicists with brain-threatening disorders, Keegan examined developments in American law on the issue, and then turned to Canadian jurisprudence. He pointed out a number of potentially significant differences between the U.S. Supreme Court's substantive due process analysis in the more recent physician-assisted suicide cases, *Washington v. Glucksberg* and *Vacco v. Quill*, and Supreme Court of Canada's approach to section 7 of Canada's Charter Rights and Freedoms (right to life, liberty and security of the person) in *Rodriguez v. British Columbia*, and cases since. The government's position

is presumably influenced by a desire to avoid a "slippery-slope" that disvalues human life. Keegan noted that although formerly other countries looked to the American Constitution for guidance, Canada's constitution is now the world's most popular role-model. Section 2 of Canada's Charter of Rights and Freedoms emphasizes "freedom of conscience and religion."

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*"Aschwin pointed out that both early-onset Alzheimer's and late onset Alzheimer's have a strong genetic component, which should favor the use of gene therapy."*

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What would be the effect of someone acting on the belief that pre-mortem cremation is the road to salvation? "Freedom of conscience" implies that secular morality is as important as religious belief and there is some emerging jurisprudence to that effect. Would the belief that good-quality cryopreservation is necessary to live again at some future time not then receive equal protection to analogous beliefs and practices of religious origin? Keegan believes that an appeal such as Donaldson's – and indeed any constitutional challenge against a law impeding access to cryonics – would have a better chance of success in Canada than in the United States.

Max More spoke without slides on the subject of "Survival, Identity, and Extended Mind." The objective of Max's talk was to consider how it could be possible to back-up personal identity-relevant information and then reintegrate that information to restore personality if cryopreservation has been imperfect. If cognitive processes and their inputs can be external to the brain, Max would like to take advantage of this to improve the chances of reviving people suffering from brain-threatening disorders. Andy Clark and David Chalmers wrote an authoritative paper entitled "The Extended Mind."

According to Max, for an outside object or process to be considered part of the mind, it has to produce results that are reasonably comparable to the components normally seen internally and biologically/neurologically. Clark and Chalmers propose three conditions for considering externally-located processes to be part of an individual's cognitive processes: 1) constancy (the external component has to be there reliably); 2) accessibility (a natural ease of use of that component); and 3) automatic endorsement (the person must trust the component as they would trust any comparable part of their natural body). Max noted that a few years before the Clark/Chalmers paper he had considered the related issue of when an external technology could be considered part of the self (in chapter 4 of his dissertation: "Technological Transformation and Assimilation"). Although Max doubted Ray Kurzweil's claim that an externally-convincing simulation of his father (made out of traces available) would actually have a self, Max did not argue that no well-simulated person could have a self. Max suggested that a notebook could be part of the thinking process, rather than just a tool. Nonetheless, he was dubious about the value of keeping lots of diaries, although it has been suggested that biographical information could assist in reconstruction of a cryonics patient and that cryonics organizations should take a more proactive role in facilitating storage of identity- and memory relevant information. Max was also dubious that a computer that could convincingly simulate a person would have a self. He raised the question "What is self?" He referred to David Hume's claim to introspectively only be able to discover thoughts and feelings, but no self. Dennett called self an illusion. This would lead me to believe that neither Hume nor Dennett should have much concern with their own survival (like most people?). Max said that he could lose a few memories without feeling his self was compromised – because he believes that personal identity is more than memory. It includes dispositions, values, and so on.

After the presentations there was a panel of all the presenters, plus Aschwin the



*Alcor member Keegan Macintosh speaks about legal strategies for cryonics*

host. I requested that each panelist explain what they would do if diagnosed with AD. Aschwin said he would immediately proceed to terminate his life under conditions favorable to cryopreservation provided that the diagnosis was credible and there are no short-term cures on the horizon. Keegan said that he would see first what, if any, time he had before symptoms such as apathy and denial would be expected to set in, and take some conservative portion of that time remaining to spend some quality time with family and friends. Keegan noted that, despite our best efforts, cryonics may not work, and thus it is rational to seek meaningful experiences in the moments one knows they have left, if such can be done without irreparably compromising one's cryopreservation. I noted that Robert Ettinger also said he would terminate life by hypothermia in a cold bathtub at the end of a party with friends – but delayed such an action to the point where he lost consciousness and lost the ability to do any such thing at the age of 92 when he deanimated. I said that I would probably spend about a year attempting to confirm the diagnosis, and might delay further trying to determine if a cure was possible or forthcoming soon. Max said that he would want a second opinion, but like Keegan wanted to have some joyful time before self-termination. Chana said that she would be very concerned about how

the decision to self-terminate would affect others, in particular how to explain to her family why she was ending her life while outwardly being in good health. Chana and Aschwin spoke of being sensitive to each other's feelings about the matter. Aschwin noted that those who care for AD family members to a natural death often suffer from severe caregiver depression. Chana said that once she had decided to pull the plug that she would “find a way to take a bath in Agent Orange and take advantage of Oregon laws.” By this she meant she would find a way to give herself an aggressive form of cancer that would cause two Oregon physicians to declare that she is a terminal patient. Once this is done, an Oregon physician can write a prescription for phenobarbital which the patient can use for suicide by overdose at the time and place of their choosing. Aubrey said that he would delay the decision without worrying too much about loss of neurons. In addition to delaying because of diagnosis confirmation and evaluating hope for a cure within a short time period, Aubrey added evaluating the likelihood that cryopreservation procedures would be improved by waiting. Mike Perry said that he would try to confirm the diagnosis and if sure about it, “get it [deanimation] over with as soon as possible.”

I mentioned the case of a CI Member dying of cancer who, with her husband,

called Suspended Animation, Inc., to be present at their suicide. Her 30-year-old husband was in good health, but did not want to live without his wife and planned to die along with her. CI terminated both their memberships and established a policy of reserving the right to cancel cryonics contracts in cases of suicide. Aschwin strongly disapproved of this CI policy. In his opinion, cryonics organizations should never encourage or condone suicide but should not refuse cryopreservation to those who have taken their own lives. I believe cryonics organizations cannot be seen as encouraging the hastening of death on the ground that cryonics may work, and must ensure that others do not get that impression. Not enough was said about what policies would be most appropriate for cryonics organizations.

I asked Aubrey if he thought that an AD patient would ever be so advanced that SENS could not save the self. Aubrey agreed that could happen, but it would be difficult to say when. The case is similar with straight frozen patients or patients with varying amounts of ischemic damage. The concept of “information theoretic death” is meaningful, but difficult to determine. Even if SENS methods could not recover enough memory and identity to save a person, some future molecular archeology might be able to do so.

There was some discussion about the most promising treatments for Alzheimer's disease. Aschwin pointed out that both early-onset Alzheimer's and late onset Alzheimer's have a strong genetic component, which should favor the use of gene therapy.

Mike described the activities of the Venturists, which is offering to save Venturist Members who are being cryopreserved by a cryonics organization that fails. Another project of the Venturists is that they are seeking \$50,000 for Mike Darwin, who lost his cryopreservation arrangements with Alcor due to financial difficulties. ■



# CONNECTOME: HOW THE BRAIN'S WIRING MAKES US WHO WE ARE

by Sebastian Seung [Houghton Mifflin Harcourt Trade, 384 pages, 2012]

## BOOK REVIEW BY ASCHWIN DE WOLF

*This review originally appeared in Venturist News and Views, Jun-Jul 2012, 6-7.*

The scientific perspective that informs Sebastian Seung's bestselling popular neuroscience book *Connectome* is so familiar to cryonicists that the bulk of this book could be mistaken for an extensive introduction to the philosophy of mind embodied in cryonics. His book offers a rigorous exposition of the view that our identity is encoded in the connections between neurons, the "connectome," which itself is shaped by our genes and life experience. The strength of this book is not only its review of the empirical evidence that supports this outlook but it's encouraging the reader to think about its implications. Readers who are intimately familiar with the argument in favor of cryonics should not assume that there is little to learn from this book. As imaging and storage technologies evolve, cryonicists can do more now than in the past to learn about their individual connectome, strengthening the likelihood of successful resuscitation.

One important element of the connectionist premise that structures Seung's book is that it does not completely resolve competing theories about how the brain works. For example, the recognition that long-term memory (and identity) does not depend on transient electrical activity but has a more robust long-term physical basis that persists during cessation of brain activity (examples are hypothermic circulatory arrest and short periods of cardiac arrest) does not imply a single perspective on how the genome provides the neurological bases for memory formation, retention, recollection, and re-

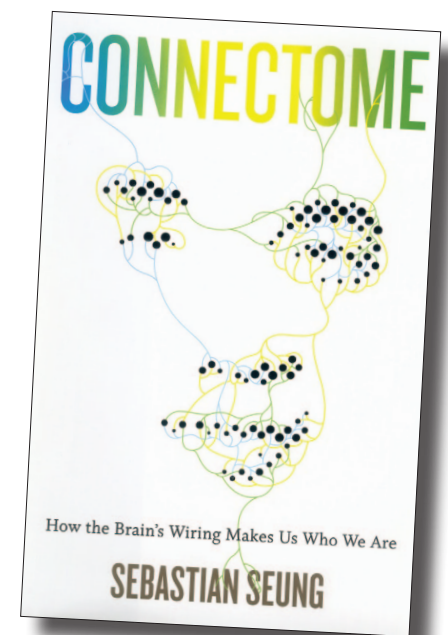
prioritization. One interesting perspective, "neural Darwinism," which was anticipated by the multi-talented classical-liberal economist Friedrich Hayek, proposes a theory of brain function in which a genetically determined wiring of the brain is subject to competing experiences that strengthen or weaken populations of synapses throughout life. One of the interesting implications of this theory is that consciousness can be treated as an emergent outcome of micro-events in the brain, instead of a mysterious, autonomous property of the brain (think of the curious concept of "free will").

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*"From the perspective of cryonics, the relationship between the genome and the connectome is of great importance."*

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Seung devotes two chapters to the nature-nurture debate through a connectionist perspective. One of the unfortunate effects of the nature-nurture distinction is that it masks the obvious point that what we call "nurture" (upbringing, environment, etc.) is not exempt from biology but simply concerns the relationship between biological systems and between a biological system and its physical environment. Social scientists who have a strong "nurture"-bias should therefore not be exempted from



describing "nurture" in verifiable physical terms, something that many of them do not feel the slightest obligation to do. Another unattractive feature of this debate is that it is routinely portrayed as one between genetic determinists and "environmentalists." In reality, the debate is mostly between serious scholars who acknowledge that behavior and learning are shaped by both genetics and the environment and those who basically consider the mind a blank slate—a position that is clearly contradicted by existing science but remains popular as a premise in contemporary public policy and certain political ideologies. One of the interesting topics that Seung discusses in these chapters is whether the plasticity of the brain changes over time.

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*“The work of resuscitation and restoring identity is not something that is expected to occur exclusively in the future but rather will be an ongoing process that starts as soon as the patient is cryopreserved.”*

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From the perspective of cryonics, the relationship between the genome and the connectome is of great importance. If some of the *basic* wiring of the brain that encodes personality and temperament is determined by genes and is fixed (or mostly fixed) at an early age, then some parts of the connectome might be inferred from a person's genome, which opens up an exciting research program for cryonics. A systematic study of the field where genetics meets neurodevelopment might help in understanding the relationship between the genome and brain ultrastructure. This in turn could assist in future resuscitation attempts. To date, the assumption in cryonics has been that the *complete* ultrastructure of the patient must be preserved (or at least preserved in such a manner that it can be inferred), but if some of it can be inferred from the genome the repair requirements for resuscitation of cryonics patients may be relaxed. Looking for such invariable features in variable brains is an important element of a credible cryonics resuscitation research program.

The power of comparing connectomes is also recognized by Seung in a separate chapter (“Comparing”). There he reviews technologies and approaches to compare connectomes with the goal of understanding personality differences and understanding neuropathologies or “connectopathies.” This chapter is one of several in which the author reviews the existing and emerging technologies that are enabling us to produce a complete connectome, including the innovative equipment of cryonicist and Alcor member Kenneth Hayworth to perform serial electron microscopy. Also

discussed are technologies such as diffusion MRI (dMRI), which allows for non-invasive mapping of the connectome at the macro scale using water as a probe. This technology may not be adequate to map the connectome at the cellular level but its contribution to comparative connectomics has already been recognized. It may also hold promise as a means to collect identity-critical information about an individual while alive, which again may lessen the computational challenges involved in cryonics resuscitation. One of the exciting prospects of the field of connectomics is that it can contribute to a further narrowing of the challenges involved in restoring cryonics patients to good health.

Seung closes his chapters on emerging technologies with a review of the prospects of connectomics for the treatment of neurological diseases. One of the potential treatments involves the re-programming of a person's own (skin) cells to neurons, which can then be introduced in the brain to treat a disease or enhance brain function. Such an approach may also be used to fill the “missing gaps” in the brain of a cryonics patient (alternative technologies include molecular construction of neurons by advanced molecular nanotechnology).

At this point, I think we can foresee a rather optimistic future for cryonics research and the prospect of resuscitation. Instead of conceptualizing cryonics as the preservation of clinically dead people in the hope that future medicine can restore these people to good health, we can envision a more complex, but more encouraging, path. The work of resuscitation and restoring identity is not something that is expected to occur exclusively in the future but rather will be an ongoing process that starts as soon as the patient is cryopreserved. And with the rise of advanced genomics and non-destructive imaging technologies, some of the initial work can be done while the person is still alive. One of the exciting aspects of being a cryonicist today is that you can take proactive steps to learn about your own connectome and other identity-relevant information.

Seung devotes no less than a whole chapter to human cryopreservation (and the associated idea of chemopreservation). The author recognizes that his own views

about the connectome are so similar to the philosophy of mind that underpins cryonics that he needs to do some justice to the rationale of cryonics. One unfortunate aspect is that he situates his discussion of cryonics in the context of religion and immortality. It is undeniable that some cryonicists are motivated by visions of personal immortality but this idea is not intrinsic to cryonics (neither is mind uploading or transhumanism.) Properly conceived, cryonics is an experimental medical procedure that aims to stabilize patients at cryogenic temperatures in anticipation of future treatment. What really distinguishes cryonics from mainstream medicine is not uncertainty (which is a fact of life), but the temporal separation of stabilization and treatment. One regrettable implication of attributing religious motives to people who make cryonics arrangements is that it cheapens the use of the word “religious.” Instead of referring to worship of a higher being, it is here used as a strong belief in something in the absence of conclusive evidence. But by putting the bar so low, Seung (unintentionally) classifies many aspects of life, including choosing novel experimental treatments in mainstream medicine, as “religious.”

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*“Now that more advanced technologies to map the human brain are becoming available, cryonics organizations are eager to use them instead of maintaining their ‘faith.’”*

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At one point Seung writes that research aimed at demonstrating that contemporary vitrification technologies can preserve the connectome will “finally bring some science to Ettinger's wager.” This is a remarkable statement because even the earliest arguments in favor of cryonics were never presented in the form of a pure wager. In his book *The Prospect*

of *Immortality*, Robert Ettinger reviews existing evidence from cryobiology and neuroscience and argues that, combined with the expectation that medicine will continue to evolve, the choice to be cryopreserved is a rational decision. Since Ettinger's book cryonics organizations and wealthy donors have expended a lot of money and time in perfecting preservation techniques and looking at the effects of new technologies on the structure and viability of the brain. Compared to the state of, let's say, interventive biogerontology, the scientific progress that has been made in cryonics is not trivial. For example, it is doubtful whether the widespread adoption of vitrification in mainstream cryobiology would have been possible without sustained research into using this approach for complex organs by cryonics supporters. To my knowledge, cryonicists have always been quite eager to generate experimental knowledge to inform their decision making. Now that more advanced technologies to map the human brain are becoming available, cryonics organizations are eager to use them instead of just passively maintaining their "faith."

Ultimately, Seung still fails to recognize that cryonics *inherently* involves an element of uncertainty that cannot be eliminated without it not being cryonics anymore (i.e., elimination of uncertainty makes it suspended animation). For example, the author recognizes that it is not necessary for a preservation technology to perfectly preserve the connectome as long as it remains possible to *infer* the original state (or missing information) from what has been preserved. We can speculate what the limits of such "neural archeology" will be, but I do not think anyone can make conclusive arguments. In this sense, cryonics cannot be completely moved from the realm of informed decision making into the realm of indisputable fact. An element of uncertainty will always be associated with it, even if the experimental evidence in favor of this medical procedure keeps mounting.

The author also discusses alternative preservation approaches such as chemical fixation and plastination. One major disadvantage of existing chemical

preservation technologies is that they are irreversible by contemporary techniques (literally a "dead end") and they do not allow for viability assays to distinguish between worse and better preservation techniques. In contrast, in cryobiology, evidence of good ultrastructural preservation is often a starting point (or independent corroboration) to identify cryoprotectants that are able to store complex organs at cryogenic temperatures and restore them without loss of viability. There is one other formidable challenge that will inevitably arise if chemical preservation is offered as a means of personal survival. It is how to deal with the fact that if chemical fixation is delayed perfusion impairment will prevent complete cross-linking of biomolecules. Even more so than cryonics, chemopreservation requires that the procedure be started prior to, or immediately following, circulatory arrest. In absence of this, the fate of a person's connectome is uncertain, and may even worsen during storage—a problem cryonics is exempt from.

The book ends with a chapter about mind uploading. One misconception about cryonics is that people seek it as a means to mind uploading, or that reviving the person in a computer is the aim of cryonics. In fact, the late Robert Ettinger became a vocal critic of mind uploading in his final years. He offered a lot of arguments for his skepticism but his main concern was that questions about the feasibility of mind uploading are ultimately empirical questions which cannot be settled by deductive reasoning and dogmatic claims about the nature of the mind or consciousness. One of the amusing aspects of the debate about mind uploading is that proponents and skeptics both accuse the other of not being consistent materialists. Interestingly enough, Seung makes an observation relevant to this debate when he writes how the idea that "information is the new soul" is implied in the mind uploading project.

Despite some misgivings about how Seung presents and conceptualizes cryonics, I am unaware of another book that offers such a clear exposition of the relationship between brain and identity that informs human cryopreservation (and

chemopreservation). The most rewarding thing for me was a stronger recognition that the idea of the connectome is not just a premise but opens the door to multiple fruitful research programs aimed at personal survival. ■



## About the Author

**Sebastian Seung**  
is Professor of

Computational Neuroscience and Physics at MIT and Investigator at the Howard Hughes Medical Institute. He has made important advances in artificial intelligence and neuroscience. His research has been published in leading scientific journals and also featured in the New York Times, Technology Review, and the Economist. (From the dust jacket.)

*Dr. Seung will be speaking at the Alcor conference in October.*



# CONNECTOME: HOW THE BRAIN'S WIRING MAKES US WHO WE ARE

By Sebastian Seung, Boston: Houghton Mifflin Harcourt, 2012

### BOOK REVIEW BY R. MICHAEL PERRY

Dr. Seung's book is a popular exposition of the working of the brain—as far as we understand it—from the standpoint of the wiring diagram or, as it has more recently been named, the *connectome*, defined as “the totality of connections in a nervous system.” Connections occur between nerve cells or neurons that allow electrical signals to be transmitted back and forth in the complicated interplay that makes us conscious beings, sensing and physically affecting our surroundings and our own bodies. Connectors for the connections have the two main forms of axons—long, thin fibers that transmit signals from one neuron out to others—and dendrites, branching structures of a neuron that receive the incoming signals from the axons of other neurons. The narrow junction or “gate” between an axon and a dendrite is called a synapse. Synapses may pass some signals while inhibiting others and may pass signals with more or less intensity depending on connection strengths or weights that are subject to modification or reweighting. Connection strengths at the synapses as well as pathways between neurons defined by the network of axons and dendrites are included in the totality of the connectome. Many in turn think that long-term memories are encoded in the synaptic placement and connection strengths, though it is not known whether this accounts for all the important cases. But if true it means that memories should be captured in the brain's connectome, along with other features of personality such as desires, dispositions and talents. The prospect that “you are your connectome” can be said to form the principal working

hypothesis of the book, even though the author acknowledges the need for more supporting evidence. The connectome hypothesis in any case is developed with the idea that the brain's essential features ought to be mappable and thus in some informational form preservable, something that should have broad appeal to cryonicists. In fact the book toward the end devotes an entire chapter to cryonics and other preservative methods that are directed toward eventual resuscitation.

To identify with one's connectome is certainly more tenable than identifying with its noted competitor, the genome, which is a fixed structure and cannot by itself account for learning or other developmental changes. The connectome instead changes throughout life. The author notes four mechanisms of change, the “four R's,” which, in order of increasing magnitude, are reweighting, reconnection, rewiring, and regeneration. Reweighting means changing the connection strength of synapses while not disturbing the synapses themselves or other features of the connectome. Reconnection is the process of creating new synapses and pruning old ones, leaving the supporting wiring (axons and dendrites) intact. If, on the other hand, the axons and dendrites are modified, so that new connection pathways between neurons and neurons or neurons and muscles, say, are created and/or older ones are pruned but the underlying neurons are not affected, then you have rewiring. Finally, if new neurons are created with new interconnecting arrays of axons, dendrites, and synapses you have regeneration. (This could also involve pruning old neurons though if too much of this happens

what you have may be better described as degeneration.) All the four R's are active in the natural brain at one time or another in the course of development and do not necessarily involve conscious effort. They also could become pathways for medical therapies that, for example, could treat disorders such as autism and schizophrenia that evidence suggests may be wiring deficiencies or “connectopathies.”

The author proposes a new scientific field, “connectomics,” that would address the issues of how we can find connectomes, how we can understand what they mean, and how we can develop new methods of constructively changing them. Developing such a field will take time, but when it comes to the most basic of the three, finding (mapping) the connectome, at least some exciting progress has occurred. First, the connectome of the nematode worm *C. elegans* was mapped. The tiny creature is only about a millimeter in length and its connectome has only about 7,000 connections for its 300-odd neurons, but mapping it was a formidable task that took more than a dozen years before it was finally completed in 1986. The human connectome is an estimated 100 billion ( $10^{11}$ ) times larger and we can only map tiny portions of it so far, but encouraging progress has been made. Among the signs of progress is the “automated tape-collecting ultramicrotome” or ATUM developed by Ken Hayworth of Harvard, which thinly slices a sample of plastinated (plastic-impregnated) brain tissue and collects the slices on a plastic tape for further analysis. As an incentive to further work in this area, Hayworth and colleagues have established a \$100,000 prize for any

team that can preserve a large brain in a way that leaves the connectome intact.

The last of the five sections of the book, “Beyond Humanity,” is a speculative look at future possibilities; the first of its two chapters covers cryonics and the second, uploading. As the author says, “there is only one truly serious problem in science and technology, and that is immortality.” If the connectome is the person, then preserving it at clinical death could be a pathway to virtual immortality, assuming future technology can reverse the preservative process, cure all ailments including aging, and supply a suitable body or other housing to continue an active lifestyle. Two possible preservation methods today are cryonics and chemical preservation. Of the two, cryonics is commercially available and Seung gives it a basically sympathetic treatment, though remaining good-naturedly skeptical. (Here I noted some minor inaccuracies. The text, for instance, suggests that a certain patient’s remains were chilled but not placed into below-freezing storage until after some litigation had ended favorably—not so. Low-temperature storage should occur as soon as possible after legal death to minimize deterioration, and this is what actually occurred.) The main questions to answer, he says, are (1) whether you are your connectome, and (2) whether cryonics (or another method) preserves the connectome intact. (Another possibility that is not considered is that you are not just your connectome but that cryonics preserves the extra portion also, still allowing for eventual resuscitation.) In any case, Seung notes, “these questions can be addressed in an intellectually rigorous way.” In the last chapter of the book Seung explores the possibilities of uploading—transferring your vital information to a computational device of the future which can then “run” you as software thus imparting a bodiless existence free of biological ailments and limitations. Connectomics would bear on this because, for example, the brain could be plastinated then mapped through destructive sectioning (a possibly cheaper alternative to cryonics), to obtain information suitable for uploading. A point not emphasized is that not every cryonicist

is comfortable with uploading or pursues cryonics with this eventual prospect in mind.

The chapter that addresses cryonics opens in a way that many cryonicists may find off-putting. Cryonics is likened to an initiation rite in a new science-based faith in which an afterlife (life after clinical death) is to be attained through future technology rather than by divine favor. That this sort of comparison would be made should not be too surprising—cryonics is seen as long shot scientifically, so that, even with some acknowledged claim to scientific validity, opting for it is viewed as an act of faith. Cryonicists generally dislike the comparison with religion, which many of them have abandoned or never accepted. They often instead fall in the “medical apologist” camp, preferring to view cryonics as simply an experimental medical procedure, a possible pathway to take a patient who is too sick for present-day medicine to a future where medicine of the day can help and in fact cure them. There is no issue of “raising the dead”—that recurring staple of faith-based traditions—since, if clinical death can ever be reversed, the patient was never really dead in the first place—and the definition of death itself needs revision. Cryonics thus challenges current definitions of death but not any important religious sentiments—or so say the apologists—though others persist in viewing matters differently, particularly some critics of cryonics—and not only these.

Indeed there are some cryonicists, myself included, who are less put off by the comparison with religion. We recognize too that inevitably some will view cryonics as a challenge to some of their cherished beliefs—but this, I submit, has a constructive resolution. Religion, in Paul Tillich’s enlightened view, is “the state of being grasped by an ultimate concern, a concern which qualifies all other concerns as preliminary and which itself contains the answer to the question of the meaning of our life.” A religious outlook, in this broad sense, does not seem out of place in a modern world where science offers increasing backing for something once thought to be the exclusive province of divinities—the conquest of death. The

conquest of death meanwhile is surely part and parcel of the “doing good” which all major religions endorse. We are already doing it in a limited way with mainstream medicine, and our capabilities are growing. It is also clear that religions evolve with the times, thus we can expect an increasing accommodation in the various religious traditions to a scientific worldview, even as the benefits of scientific approaches are increasingly felt. So I look forward to increasing ties with religion, at least if we understand it in Tillich’s broad sense rather than focusing narrowly on certain dogmas and rituals. Seung probably did not have all this in mind in his discussion of cryonics, but I see it as a logical outgrowth of his thinking, and something encouraging.

In all, I found the book to be highly informative about the working of the brain as we understand it today, with the caveat that there is much indeed that we still don’t understand, despite our decades of progress in this as in many other areas. The important question remains of whether the connectome is really sufficient to characterize the individual, a major unknown being whether memories are captured in full detail in the connectome as opposed to, for example, microtubules or other molecular-level structures being essential. The connectome of *C. elegans* was mapped more than a quarter century ago as noted but it has not so far provided the sought-for explanation of the behavior of this organism, adding to the skepticism about the adequacy of connectomics to account for the workings of the nervous system. Is the individual neuron, a complicated structure in its own right, something we should have a detailed model of, beyond the simplistic level that the connectome seems limited to? Or is it possible that these details, though real, are not essential in characterizing the individual from a cryonics standpoint, but could be changed or substituted within reasonable limits without affecting the essential nature of that individual? While these questions at present remain unanswered, it seems likely the new science of connectomics will make useful contributions in the personal goal that is important to us, of survival beyond life’s present limits. ■



# ALCOR - 40<sup>th</sup> CONFERENCE



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Alcor-40 Conference has established a rate of \$159 per night plus tax. In addition to the \$159, there will be gratuities added of \$2/night for the maid and a one time charge of \$8/adult for bellman assistance during check in and check out.

## Speakers and Panels



**Jim Lane**  
Mayor of Scottsdale, Arizona

Scottsdale Mayor Jim Lane will open the conference.



**Catherine Baldwin**  
**From Bedside to Clinic: The Evolving Care of Cryopreservation Patients**

Catherine is Chief Operating Officer of Suspended Animation, Inc. (SA). Before joining SA in mid-2007, Catherine served as Director of Business Development for Pharmaceutical Platforms at Symyx Technologies and as a Strategic Marketing Manager for Applied Biosystems. As a cell biologist in Neurobiology at UCLA and in Cardiopulmonary Physiology with the Lovelace Institutes, she pursued research interests in the molecular mechanisms of glutamate in the brain and thermoregulatory responses to hypoxia and ischemia.



**Aubrey de Grey, Ph.D.**  
**Experimental Rejuvenation Research: An Update**

Dr. de Grey is a biomedical gerontologist based in Cambridge, UK and Mountain View, California, and is the Chief Science Officer of SENS Foundation, a California-based charity dedicated to combating the aging process. He is also Editor-in-Chief of Rejuvenation



Research, the world's highest-impact peer-reviewed journal focused on intervention in aging. He has developed a comprehensive plan for repair of aging damage, termed Strategies for Engineered Negligible Senescence (SENS), which breaks aging down into seven major classes of damage and identifies detailed approaches to addressing each one.



### **Chana & Aschwin de Wolf** **Cryopreservation of the Ischemic Brain**

In 2008 Chana and Aschwin de Wolf launched the neural cryobiology research company Advanced Neural Biosciences, Inc. In this presentation they present the results of many years of experimental research investigating the effects of ischemia on brain cryopreservation. They will also announce a new ambitious project to further strengthen the evidence in favor of human cryopreservation.



Chana de Wolf lives in Portland, Oregon, where she works as a business manager and biomedical researcher. She holds a B.S. in Experimental Psychology (2001), an M.S. in Cognition and Neuroscience (2003), and has extensive management and laboratory experience. Aschwin de Wolf is a Director and researcher for Advanced Neural Biosciences, President of the Institute for Evidence Based Cryonics, editor of *Cryonics* magazine, serves as a consultant for a number of cryonics organizations, and has published technical articles on various cryonics topics.



### **Gregory Fahy, Ph.D.** **Progress Toward the Reversible** **Cryopreservation of Complex Systems**

Dr. Fahy is the Vice President and Chief Scientific Officer of 21st Century Medicine, where he has directed research since 1998. He is the pioneer of high concentration, slow cooling rate vitrification, which he introduced in the early 1980s while a scientist at the national research laboratory of the American Red Cross. He has been a full-time cryobiologist since 1977 and has many publications and patents related to cryobiology and life extension. His main research and academic interests are the cryopreservation of complex systems and interventional gerontology. In 2009, he published the first account of the survival of a vitrified kidney after transplantation. His current research projects include the cryopreservation of kidneys, brains, and whole mammals.



### **Todd Huffman** **Advances in Neuroscience Structure,** **Function, and Computation: Implications** **for Cryonics**

Todd Huffman is an informatician and designer working in biomedical imaging and system

design. He is the founder and CEO of 3Scan, which is building high-throughput 3D microscopes for imaging and digitally reconstructing large scale tissues and organs. 3Scan's flagship technology, the Knife-Edge Scanning Microscope, can image whole small animal brains with sub-micron resolution. Todd has been involved in cryonics for 10 years, as the co-leader of the Alcor Southern California Field Team, full-time at Alcor as a researcher, and as a consultant with Suspended Animation on training and system design. Todd holds a Masters in Computational Biosciences from Arizona State University, a Graduate Diploma in Entrepreneurial Studies from Nanyang University in Singapore, and a Bachelor of Science in Neuroscience from California State University Long Beach.



### **Keegan Macintosh, J.D.** **Access to Cryonics: Legal Strategies Then** **and Now**

Keegan is a recent law graduate from the University of British Columbia, where he founded the UBC Life Extension Club in 2010 to spread awareness of cryonics and life extension research. During its start-up this summer, Keegan was Executive Director of the Lifespan Society of British Columbia, a non-profit organization which aims to educate the public on life extension strategies and protect access to potentially life-saving technologies. Keegan sits on the boards of two other cryonics organizations, the Cryonics Society of Canada and the Institute for Evidence Based Cryonics. He will discuss changes in the legal landscape regarding the right to a pre-mortem cryopreservation since the 1992 appellate court decision in *Donaldson v. Van De Kamp*.



### **Josh Mitteldorf, Ph.D.** **Directions for Medical Research: Four Paths** **to Extending Life**

The surprising fact that our bodies are genetically programmed to age and to die offers an enormous opportunity for medical intervention. It may be that therapies to slow the progress of aging need not repair or regenerate anything, but only need to interfere with an existing program of self-destruction. After earning a Ph.D. in astrophysics, Mitteldorf moved to evolutionary biology as a primary field in 1996. He has taught at Harvard, Berkeley, Bryn Mawr, LaSalle and, most recently, at Temple University. His present research, on evolutionary theory of aging using computer simulations, is under the auspices of the Ecology and Evolutionary Biology Department of the University of Arizona. His book, *Suicide Genes*, will be published early 2013.





**Max More, Ph.D.**  
**Improving Your Prospects for an Optimal Cryopreservation**

Max More is President and Chief Executive Officer at Alcor.



**Michael Rose**  
**How to Control Your Aging**

Dr. Michael R. Rose is Professor at Department of Ecology and Evolutionary Biology at University Of California, Irvine. His main area of work has been the evolution of aging. He is known for experiments that substantially postpone aging in fruit flies. His two primary current research interests are the evolution of late life and experimental evolution in *Drosophila*. Michael's most recent books are *The Long Tomorrow: How Advances in Evolutionary Biology Can Help Us Postpone Aging* and *Does Aging Stop?*. Dr. Rose will discuss how the last two years have seen a remarkable convergence between the Paleo Movement and evolutionary research on aging. Residual later-age adaptation to the paleo lifestyle may allow the deceleration and early stabilization of death rates with the adoption of an evolutionarily correct emulation of paleo lifestyle at later ages. This talk will feature the science, both theoretical and experimental, that underlies this possibility.



**Anders Sandberg**  
**Handling the Unknowable and Undecidable: Rational Decision-Making about Future Technology**

Anders Sandberg has a background in computational neuroscience. Since 2006 he has been a researcher at Oxford University's Future of Humanity Institute and the Oxford Martin Programme on the Impacts of Future Technology. His research centers on societal and ethical issues surrounding human enhancement and new technology, as well as estimating the capabilities and underlying science of future technologies. Topics of particular interest include enhancement of cognition, cognitive biases, technology-enabled collective intelligence, neuroethics and public policy.



**Sebastian Seung**  
**Connectomics and Cryonics**

Sebastian Seung is Professor of Computational Neuroscience at the Massachusetts Institute of Technology, author of *Connectome: How the Brain's Wiring Makes Us Who We Are*, and Scientific Director of WiredDifferently. He received his Ph.D. in Theoretical Physics from Harvard University, and formerly worked at Bell Laboratories. His laboratory at MIT has launched EyeWire, an online community that empowers the public to map

neural connections by playing a game of coloring neural images. EyeWire is the first project of WiredDifferently, a citizen science organization with the ultimate goals of seeing the material basis of memory and finding connectopathies, "miswirings" of the brain long hypothesized to be associated with psychiatric disorders. His book *Connectome* was hailed in the Wall Street Journal as "the best lay book on brain science I've ever read."

**Panel on Long-Term Financial Planning:**  
**Michael Seidl, Ralph Merkle, Rudi Hoffman**



Panel discussion on investing strategies, inflation protection, and personal trusts, with Alcor Board members **Michael Seidl** and **Ralph Merkle**, Certified Financial Planner and insurance agent **Rudi Hoffman** (speaking on "Cryonics Affordability for the Masses and for All Times"), and others to be confirmed.

**Panel on Medical Monitoring Devices:**  
**Led by Aaron Drake with Ben Best, Martine Rothblatt, and Danila Medvedev**



Panel discussion on improving your chances of a quick response in case of a critical physiological failure, led by Alcor's Medical Response Director, **Aaron Drake**. **Ben Best** is a past president of the Cryonics Institute and has bachelor's degrees in Pharmacy, Physics, Computing Science, and Business (Accounting and Finance). **Martine Rothblatt** is co-founder of the Terasem Movement, the chief executive of United Therapeutics, and the creator of Sirius XM Satellite Radio. She has also authored *From Transgender to Transhuman: A Manifesto on the Freedom of Form*, and was the Executive Producer of the film *Singularity Is Near*. **Danila Medvedev** co-founded the Russian Transhumanist Movement and in 2005 helped launch KrioRus, the first cryonics company outside the US. He has a bachelor degree in Business Administration from IMISP, the first Russian business school and currently hosts a futurology TV show "Program for the Future" on Russia-2 television channel. He will be speaking on "Can wearable death alert systems really catch on?"



## Conference Schedule (tentative)

### Friday October 19, 2012

5:00 pm - 8:00 pm	Registration
7:00 pm - 10:00 pm	Reception
8:00 pm	Welcome Address
10:00 pm until late	Networking

### Saturday October 20, 2012

7:30 am - 12:00 noon	Registration	
7:30 am - 8:30 am	<b>Breakfast</b>	
9:00 am - 9:10 am	Jim Lane	Welcome from the Mayor of Scottsdale
9:10 am - 9:15 am	Max More	Opening remarks
9:15 am - 9:50 am	Greg Fahy	Progress Toward Reversible Cryopreservation of Complex Systems
9:50 am - 10:25 am	Chana de Wolf Aschwin de Wolf	Cryopreservation of the Ischemic Brain
10:25 am - 10:50 am	Break	
10:50 am - 11:10 pm	Max More	Cryonics Procedures and Improvements at Alcor
11:10 am - 11:45 am	Keegan Macintosh	Legal Strategies for Cryonicists
11:45 am - 12:35 pm	Panel	Long Term Financial Planning
12:35 pm - 2:20 pm	<b>Lunch</b>	
2:20 pm - 3:10 pm	Panel	Medical Monitoring Devices
2:20 pm - 3:10 pm	Anders Sandberg	Rational Decision Making About Future Technology
3:30 pm - 4:00 pm	Break	
4:00 pm - 4:35 pm	Max More	Improving Your Prospects for an Optimal Cryopreservation
4:35 pm - 5:10 pm	Todd Huffman	Advances in Neuroscience: Implications for Cryonics
5:10 pm - 5:45 pm	Sebastian Seung	Connectomics and Cryonics
5:45 pm - 6:10 pm	Discussion	Discussion of Sebastian Seung's talk
5:10 pm - 6:30 pm	Sign-Up Salon	
7:00 pm - 10:00 pm	<b>Banquet Dinner</b>	
10:00 pm until late	Networking	

### Sunday October 21, 2012

7:00 am - 9:00 am	<b>Breakfast</b>	
9:30 am - 10:05 am	Catherine Baldwin	From Bedside to Clinic: The Evolving Care of Cryopreservation Patients
10:05 am - 10:40 am	Aubrey de Grey	Experimental Rejuvenation Research: An Update
10:40 am - 11:00 am	Break	
11:00 am - 11:35 am	Joshua Mitteldorf	Directions for Medical Research: Four Paths to Extending Life
11:35 am - 12:10 pm	Michael Rose	How to Control Your Aging
12:10 pm - 12:20 pm	Break	
12:20 pm - 12:55 pm	Panel	Panel with de Grey, Mitteldorf, and Rose
2:30 pm - 7:30 pm	<b>Alcor Open House &amp; Cookout</b>	
2:30 pm - 7:30 pm	Sign-Up Salon	



## Sponsorship Opportunities

We are asking for sponsors to step forward and help cover the costs of bringing in speakers and contributing to the many other expenses of what we aim to be Alcor's best-attended conference to date. Remember that your contributions may be tax-deductible.

	Sponsorship Opportunity	Amount	Available
General Conference	Alcor Patron	\$ 5,000	3
	Alcor Sustainer	\$ 2,500	4
	Alcor Supporter	\$ 1,000	5
	Journal Publisher	\$ 1,750	2
<b>Friday, October 19</b>			
Opening Reception	Reception Grand Host	\$ 1,000	1
	Reception Host	\$ 500	2
	Reception Contributor	\$ 250	4
<b>Saturday, October 20</b>			
Continental Breakfast	Provider	\$ 1,000	1
	Contributor	\$ 500	2
Program Panels	Speaker Host	\$ 2,000	3
	Speaker Associate	\$ 500	6
Hosted Breaks	Provider	\$ 500	2
	Contributor	\$ 250	4
Evening Reception	Reception Grand Host	\$ 1,000	1
	Reception Host	\$ 500	2
	Reception Contributor	\$ 250	4
<b>Sunday October 21</b>			
Alcor 40th Anniversary Cookout	Food Sponsor	\$ 2,000	2
	Beverage Sponsor	\$ 500	2
	Tour Sponsor	\$ 250	2

To arrange a sponsorship contact Bonnie Magee, 480-905-1906 x114 or [bonnie@alcor.org](mailto:bonnie@alcor.org)



Kim Suozzi before  
her diagnosis

# Needing Cryonics At Age 23

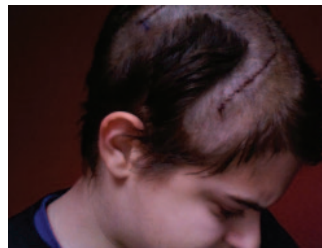
By Shannon Vyff

*The following story is an example of why it is good to set up cryonics arrangements at a young age. The Society for Venturism, a cryonics advocacy group, has set up a charity to help a woman who had wanted to set up cryonics arrangements when she was out of college and in a career, but was stricken with brain cancer at age 21. She is an Associate Member of Alcor and an unfunded member of the Cryonics Institute. She is hoping to raise enough funds to be cryopreserved at either organization, depending on the amount raised. All funds donated to the Venturists for her charity go to her cryopreservation. If she is not cryopreserved, or if an excess is raised, the donor can choose to leave their money in the fund for the next charity recipient or have it refunded. In the case of this young woman, she does not have much time left.*

## Venturist Charity Fund Recipient Kim Suozzi's Story

During her Senior Year in college, Kim Suozzi had been maintaining excellent grades even while experiencing as she phrased it, "odd headaches." This didn't worry her so much – she stayed focused on school – until one day while traveling to school she had a seizure that lasted 30 minutes and caused disassociation from her right arm and difficulty speaking. She ended up at her local hospital that same day where a large mass was seen in her brain.

In March 2011, two months before she was set to graduate, at age 21, Kim Suozzi was told that she had a highly aggressive form of brain cancer and that she had 14 months to 2 years to live. While her peers were finishing their degrees and pursuing job leads, she was thrown into a world of seeking medical opinions and treatments and searching for some hope she could beat the Glioblastoma Multiforme (GBM) tumor. She didn't have time to go back to classes after her diagnosis, nonetheless, in the Spring of 2011 Truman State University invited Kim to walk with her peers across the stage at graduation.



A picture of Kim's scar after  
surgery to remove the tumor.

After graduation instead of job searches, Kim searched treatment options for fighting GBM. Her entire tumor was removed by Washington University's Teaching Hospital. Unfortunately despite a clean MRI after surgery, pathology indicated the tumor was a highly aggressive form that would come back. A second opinion from a top pathologist at M.D. Anderson revealed devastating news, the diagnosis was an even more aggressive subtype of GBM that had been originally thought and she was given even less time to live. After her surgery she started on endless rounds of radiation and chemo. Even during the treatments she didn't give up on having a career some day; she was able to maintain a job assisting with cognitive neuroscience research in an EEG lab at the University of Missouri.

Nearly a year of cancer treatments passed. In April 2012 Kim found out that instead of conquering her brain tumor with some of the best doctors and researchers in the world, the tumor had returned and was growing. The experts reduced her estimated survival time even further. Through her persistence and research she was able to enroll in a clinical trial at Dana-Faber. She responded well initially, then sadly, the tumor began to grow again. She is currently taking radiation rounds at Duke University to, as she puts it, "buy a few months of time." She is progressively losing function on her right side, can't use her hand or arm and is already walking with a limp. Her tumor will cut off her air and kill her before it gets to her brain and "who she is" that is one thing she felt helped her odds with cryonics. Already her speech is affected. Since that day the tumor was discovered on her way to school she has lived a year and a half fighting cancer. Currently she has been told she has 3-6 months left, and she is still trying to find ways to beat it while at the same time trying to wrap her brain around accepting that she is dying at such a young age.

On June 10th 2012 Kim posted an article on Reddit titled, "Today is my 23rd birthday





Kim now, with her college sweetheart Josh.

and probably my last. Anything awesome I should try before I die?" In just a few weeks the article had 1,697 comments with everything from beautiful places to travel to suggestions to max-out her credit cards on luxury items. A cryonicist saw her article and commented that maybe she would want to look into cryonics.

Kim had taken a Cognitive Science class during her time studying Neuro Science at Truman State. When she read the comment about cryonics under her article on Reddit she remembered a book she'd read in Cog Sci her Sophomore Year, Ray Kurzweil's *Age of Spiritual Machines*. She'd enjoyed it so much she picked up another book of his, *The Singularity is Near*. She said, "I had always planned on establishing cryopreservation plans through life insurance, I was caught off guard when I was suddenly diagnosed during my last month and a half of college." So when she read that comment on Reddit, Kim knew about cryonics and started to look into the current cryonics organizations and the level of science in the field.

Kim decided she wanted to be cryonically preserved, knowing it was only a chance and at the current state future technology is required to repair damage—but she felt it would give her some comfort knowing she may have a chance to finish life. As she said, "I wish I could give a particularly compelling reason why I deserve another chance at life, but there's not much to say. I'm still just a kid... Unfortunately the most interesting thing I have yet managed to do is get a terminal disease at a young age."

Within days of Kim's deciding she wanted to try cryonics many who were prominent in the cryonics community contacted her to see how they could help. Someone sent

her story to the Society for Venturism and she was chosen as a recipient of the Society's Cryonics Charity Fund. Kim said she was excited to hear from the cryonicists and was impressed with the community's coordination. She had been raising money on her own and so far has raised a few thousand dollars but the donations stalled after the first few days. The Venturists, a cryonics advocacy organization, provides a third-party way to have donations given for her suspension and ensure that all donations go to a cryonics organization. Having the cryonics community coming together to help her gave hope that the needed funds, a minimum of \$28,000, will be raised in the short time she has left.

Kim had been worried about breaking the news to her family that she wanted to be cryonically preserved; she didn't want to be seen as "giving up." Kim signed up as a member of the Cryonics Institute and an Associate member of Alcor Life Extension Foundation, saying, "The only thing that I can think to make me feel a little more at ease with my death is to secure cryopreservation plans on the off-chance that they figure out how to revive people in the future. The way I see it, it's a better bet than decomposing or getting cremated."

Kim started conversations with her family, friends and people online about her wish to try cryonics. There were various reactions online and within her family, but her mother and her boyfriend of four years are strongly behind her. Kim is hoping the cryonics community and others will enthusiastically support the Venturist Charity Fund, as it has successfully helped two other people get cryonics arrangements already. It is set up to help those who are unable to get life insurance, the normal source of funds for cryonics, and have had a desire to be cryonically preserved.

Please consider donating any amount, large or small—all donations are needed. All donations will go to Kim's suspension. If for any reason Kim is not preserved the donation can be refunded to you (you will be notified and asked) or it can be left in the Venturist Charity Fund to help the next person in need or you can give it to the Venturist's Cryonics Outreach Fund.

The Venturists have had three Cryonics Charity Cases in the past decade since

starting the program in 2001. Only the second was unable to be preserved; the others were successful. (The first case, a paralysis victim who was unable to earn a living or afford arrangements, is still animate, with fully funded arrangements in place.) Many who donated to the second case had their donations refunded when the suspension didn't go through so you can safely donate large amounts.

The Society for Venturism is a 501(c)(3), tax-exempt, nonprofit organization. Donations are tax deductible. A receipt will be given to you for your donation.

Donate to the Venturist Cryonics Charity Fund for Kim Suozzi at:

<http://venturist.info/kim-suozzi-charity.html> or send a check with Kim's name or Cryonics Charity in the memo/for line to:

**The Society for Venturism  
11255 SSR 69  
Mayer, AZ 86333 USA**

Thank you. I admire that the cryonics community comes together to help someone in need, someone who lacks the necessary funding, but is otherwise like ourselves. Let us give her a chance. Due to a generous donation of \$10,000.00 by the Life Extension Foundation, Kim's consolidated fund is currently at \$20,000.00. ■

## About the Author

**Shannon Vyff**, (806) 445-6417, [shannonvyff@yahoo.com](mailto:shannonvyff@yahoo.com)  
Society for Venturism Director,  
LongeCity Board Member, Lifeboat  
Foundation Advisor, contributing  
author to *The Scientific Conquest of Death*, author of the cryonics family  
adventure *21st Century Kids*, Alcor  
and Cryonics Institute Member





# Alcor Member Forums

Discussion board of the Alcor Life Extension Foundation

Discuss Alcor and cryonics topics with other members and Alcor officials.

- The Alcor Foundation
- Cell Repair Technologies
- Cryobiology
- Events and Meetings
- Financial
- Rejuvenation
- Stabilization

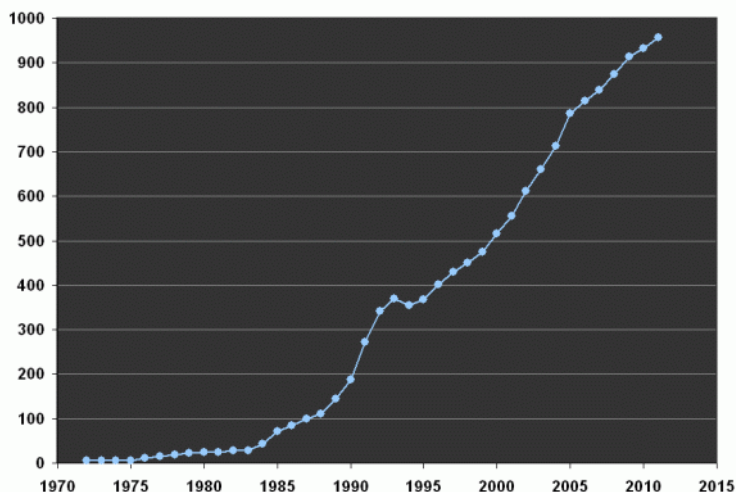
Other features include pseudonyms (pending verification of membership status) and a private forum.

<http://www.alcor.org/forums/>

2012	01	02	03	04	05	06	07	08	09	10	11	12	
<b>TOTAL</b>	956	959	963	967	968	974							974
<b>FINALIZED</b>	2	4	5	6	2	7							26
<b>REINSTATED</b>	0	1	1	0	0	1							3
<b>CANCELLED</b>	3	2	1	1	1	2							10
<b>TRANS TO ASSOCIATE</b>	0	0	0	1	0	0							1
<b>CRYO-PRESERVED</b>	0	0	1	0	0	0							1
<b>NET GAIN</b>	-1	+3	+4	+4	+1	+6							+18

## Membership Statistics

As of June 30, 2012, Alcor had 974 cryopreservation members, 13 associate members, and 111 patients. Here is a chart with 2012 membership growth statistics to date and a graph showing the number of Alcor cryopreservation members at year end since inception.



# The Ultimate Two-Per-Day Formula



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Sample Ingredient Comparison	LIFE EXTENSION® TWO-PER-DAY	Centrum® Silver® Adults 50+
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Vitamin D	2,000 IU	500 IU
Vitamin B1	75 mg	1.5 mg
Vitamin B2	50 mg	1.7 mg
Vitamin B6	75 mg	3 mg
Vitamin B12	300 mcg	25 mcg
Niacin (as niacinamide)	50 mg	20 mg
Pantothenic acid	100 mg	10 mg
Vitamin E	100 IU (natural)	50 IU (synthetic)
Natural Folate	400 mcg	400 mcg (synthetic)
Zinc	30 mg	11 mg
Selenium	200 mcg	55 mcg
Lutein	5,000 mcg	250 mcg
Lycopene	2,000 mcg	300 mcg
Biotin	300 mcg	30 mcg
Boron	3,000 mcg	150 mcg
Chromium	200 mcg	45 mcg
Molybdenum	100 mcg	45 mcg
Magnesium	100 mg	50 mg
Manganese	2 mg	2.3 mg
Iodine	150 mcg	150 mcg
Potassium	25 mg	80 mg
Vitamin A (as beta-carotene)	4,500 IU	1,000 IU
Vitamin A (preformed)	500 IU	1,500 IU
Choline (as bitartrate)	20 mg	(none)
Inositol	50 mg	(none)
PABA	30 mg	(none)
Calcium	12 mg	220 mg
Alpha Lipoic Acid	125 mg	(none)

Contains soybeans, rice, and corn.



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ConsumerLab.com Survey of Supplement Users.  
More information at [www.consumerlab.com](http://www.consumerlab.com).

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or visit [www.LifeExtension.com](http://www.LifeExtension.com)

Commercial "one-a-day" supplements provide very low potencies.

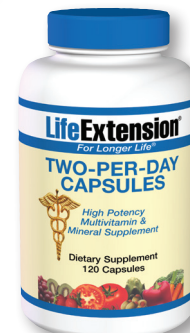
Compared to conventional "one-a-day" products, **Life Extension Two-Per-Day** contains up to 50 times more potency! This Two-Per-Day formula is available in tablet or capsule form.

The box to the left reveals how much more potent **Two-Per-Day** is compared to the leading commercial multi-vitamin.

Commercial supplements often contain the cheapest form of nutrients that don't provide optimal benefits. For example, the 50 IU of synthetic vitamin E contained in Centrum® Silver® Adults 50+ may provide relatively little vitamin E to the bloodstream. The 100 IU of natural vitamin E contained in Two-Per-Day provides much more vitamin E activity.



Item # 01615  
Tablets



Item # 01614  
Capsules

## Compared to Centrum® Silver® Adults 50+, Two-Per-Day Tablets or Capsules provide about:

- 4 times more Vitamin D
- 8 times more Vitamin C
- 2 times more Vitamin E
- 10 times more Biotin
- 20 times more Boron
- 4 times more Selenium
- 25 times more Vitamin B6
- 50 times more Vitamin B1
- 12 times more Vitamin B12
- More than twice as much niacin, zinc, and many other nutrients

**Two-Per-Day Tablets** retail for \$20, but members pay only **\$13.50 each** when four bottles are purchased. **Two-Per-Day Capsules** retail for \$22, but cost members only **\$15 each** when four are purchased.

Each bottle of **Two-Per-Day** lasts **60 days**, so members can obtain the benefits of this high-potency formula for as little as **\$7.50 per month**.

These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.

# MEETINGS

## About the Alcor Foundation

The Alcor Life Extension Foundation is a nonprofit tax-exempt scientific and educational organization dedicated to advancing the science of cryopreservation and promoting cryonics as a rational option. Being an Alcor member means knowing that—should the worst happen—Alcor's Emergency Response Team is ready to respond for you, 24 hours a day, 365 days a year.

Alcor's Emergency Response capability includes specially trained technicians and customized equipment in Arizona, northern California, southern California, and south Florida, as well as many additional certified technicians on-call around the United States. Alcor's Arizona facility includes a full-time staff, and the Patient Care Bay is personally monitored 24 hours a day.

## ARIZONA

### Flagstaff:

Arizona without the inferno. Cryonics group in beautiful, high-altitude Flagstaff. Two-hour drive to Alcor. Contact [eric@flagstaffcryo.com](mailto:eric@flagstaffcryo.com) for more information.

### Scottsdale:

This group meets the third Friday of each month and gatherings are hosted at a home near Alcor. To RSVP, visit <http://cryonics.meetup.com/45/>.

### At Alcor:

Alcor Board of Directors Meetings and Facility Tours – Alcor business meetings are generally held on the first Saturday of every month starting at 11:00 AM MST. Guests are welcome. Facility tours are held every Tuesday and Friday at 2:00 PM. For more information or to schedule a tour, call D'Bora Tarrant at (877) 462-5267 x101 or email [dbora@alcor.org](mailto:dbora@alcor.org).

The Alcor Volunteer Network, Scottsdale Chapter has a variety of meetings on topics including: member education, training, community outreach, and fundraising. To RSVP, visit: <http://www.meetup.com/AVNScottsdale/members/>

## CALIFORNIA

### Los Angeles:

Alcor Southern California Meetings—For information, call Peter Voss at (310) 822-4533 or e-mail him at [peter@optimal.org](mailto:peter@optimal.org).

Although monthly meetings are not held regularly, you can meet Los Angeles Alcor members by contacting Peter.

### San Francisco Bay:

Alcor Northern California Meetings are held quarterly in January, April, July, and October. A CryoFeast is held once a year. For information on Northern California meetings, call Mark Galeck at (408) 245-4928 or email [Mark\\_galeck@pacbell.net](mailto:Mark_galeck@pacbell.net).

## FLORIDA

Central Florida Life Extension group meets once a month in the Tampa Bay area (Tampa and St. Petersburg) for discussion and socializing. The group has been active since 2007. Email [arcturus12453@yahoo.com](mailto:arcturus12453@yahoo.com) for more information.

## NEW ENGLAND

### Cambridge:

The New England regional group strives to meet monthly in Cambridge, MA – for information or to be added to the Alcor NE mailing list, please contact Bret Kulakovich at 617-824-8982, [alcor@bonfireproductions.com](mailto:alcor@bonfireproductions.com), or on FACEBOOK via the Cryonics Special Interest Group.

## PACIFIC NORTHWEST

Cryonics Northwest holds regular meetings for members of all cryonics organizations living in the Pacific Northwest.

For information about upcoming meetings and events go to: <http://www.cryonicsnw.org/> and <http://www.facebook.com/cryonics.northwest>

A Yahoo mailing list is also maintained for cryonicists in the Pacific Northwest at <http://tech.groups.yahoo.com/group/CryonicsNW/>.

## British Columbia (Canada):

The contact person for meetings in the Vancouver area is Keegan Macintosh: [keegan.macintosh@me.com](mailto:keegan.macintosh@me.com)

## Oregon:

The contact person for meetings in the Portland area is Chana de Wolf: [chana.de.wolf@gmail.com](mailto:chana.de.wolf@gmail.com)

## ALCOR PORTUGAL

Alcor Portugal is working to have good stabilization and transport capabilities. The group meets every Saturday for two hours. For information about meetings, contact Nuno Martins at [n-martins@n-martins.com](mailto:n-martins@n-martins.com). The Alcor Portugal website is: [www.alcorportugal.com](http://www.alcorportugal.com).

## TEXAS

### Dallas:

North Texas Cryonauts, please sign up for our announcements list for meetings (<http://groups.yahoo.com/group/cryonauts-announce>) or contact David Wallace Croft at (214) 636-3790 for details of upcoming meetings.

## Austin/Central Texas:

We meet at least quarterly for training, transport kit updates, and discussion. For information: Steve Jackson, 512-447-7866, [sj@sjgames.com](mailto:sj@sjgames.com).

## UNITED KINGDOM

There is an Alcor chapter in England. For information about meetings, contact Alan Sinclair at [cryoservices@yahoo.co.uk](mailto:cryoservices@yahoo.co.uk). See the web site at [www.alcor-uk.org](http://www.alcor-uk.org).

If you are interested in hosting regular meetings in your area, contact Alcor at 877-462-5267, ext. 113. Meetings are a great way to learn about cryonics, meet others with similar interests, and introduce your friends and family to Alcor members!



# WHAT IS CRYONICS?

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Cryonics is an attempt to preserve and protect human life, not reverse death. It is the practice of using extreme cold to attempt to preserve the life of a person who can no longer be supported by today's medicine. Will future medicine, including mature nanotechnology, have the ability to heal at the cellular and molecular levels? Can cryonics successfully carry the cryopreserved person forward through time, for however many decades or centuries might be necessary, until the cryopreservation process can be reversed and the person restored to full health? While cryonics may sound like science fiction, there is a basis for it in real science. The complete scientific story of cryonics is seldom told in media reports, leaving cryonics widely misunderstood. We invite you to reach your own conclusions.

## HOW DO I FIND OUT MORE?

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The Alcor Life Extension Foundation is the world leader in cryonics research and technology. Alcor is a non-profit organization located in Scottsdale, Arizona, founded in 1972. Our website is one of the best sources of detailed introductory information about Alcor and cryopreservation ([www.alcor.org](http://www.alcor.org)). We also invite you to request our FREE information package on the "Free Information" section of our website. It includes:

A fully illustrated color brochure

- A sample of our magazine
- An application for membership and brochure explaining how to join
- And more!

**Your free package should arrive in 1-2 weeks.**

(The complete package will be sent free in the U.S., Canada, and the United Kingdom.)

## HOW DO I ENROLL?

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Signing up for a cryopreservation is easy!

**Step 1:** Fill out an application and submit it with your \$150 application fee.

**Step 2:** You will then be sent a set of contracts to review and sign.

**Step 3:** Fund your cryopreservation. While most people use life insurance to fund their cryopreservation, other forms of prepayment are also accepted. Alcor's Membership Coordinator can provide you with a list of insurance agents familiar with satisfying Alcor's current funding requirements.

**Finally:** After enrolling, you will wear emergency alert tags or carry a special card in your wallet. This is your confirmation that Alcor will respond immediately to an emergency call on your behalf.

**Call toll-free today to start your application:**

**877-462-5267 ext. 132**

**[info@alcor.org](mailto:info@alcor.org)**

**[www.alcor.org](http://www.alcor.org)**





# Will You Be Alive and Healthy 10...20...30 Years from now?

Your best chance at achieving future immortality is to protect your precious health now so you can benefit from future medical breakthroughs. Staying informed about the latest health discoveries can mean the difference between life and premature death.

And the **Life Extension Foundation** can be your passport to the future. As the largest anti-aging organization in the world, we are dedicated to finding scientific ways to prevent disease, slow aging, and eventually stop death.

For more than three decades, Life Extension has been at the forefront of the movement to support revolutionary anti-aging research that is taking us closer to our goal of extending the healthy human life span indefinitely. We inform our members about path-breaking therapies to help keep them healthy and alive.

## Join today and you'll receive these life-prolonging benefits:

- A subscription to *Life Extension* magazine (\$59.88 yearly newsstand value)...Over 100 full-color pages every month are filled with medical research findings, scientific reports, and practical guidance about using diet, nutrients, hormones, and drugs to prevent disease and slow aging.
- Access to a toll-free phone line to speak with **knowledgeable health advisors**, including naturopathic doctors, nutritionists, and a cancer expert, about your individual health concerns. You can also receive help in developing your own personal life extension program.
- Discounts on prescription drugs, blood tests, and pharmaceutical quality supplements that will greatly

exceed your membership dues. You'll receive a directory listing the latest vitamins and supplements, backed by scientific research and available through a unique buyers club.

## FREE BONUS!

- ***Disease Prevention and Treatment* book** (\$49.95 cover price)...this hardbound fourth edition provides novel information on complementary therapies for 133 diseases and illnesses—from Alzheimer's disease to cancer, from arthritis to heart disease—that is based on thousands of scientific studies.

Life Extension Foundation funds advanced vitrification and gene-chip research. Your \$75 membership fee helps support scientific projects that could literally save your life.

**Call 1-866-820-4967 today.**

**LIVE**  
Healthier & Longer

**LifeExtension**<sup>SM</sup>  
FOUNDATION

**Join today. Call toll-free 1-866-820-4967. Or visit [www.lef.org/pim](http://www.lef.org/pim)  
Mention Code: PIM**