Magnet Implants? Welcome to the World of Medical Punk

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SURFACING

Jesika Foxx, a cosmetic tattoo artist, and Russ Foxx, a professional body-modification artist, whose face is tattooed on the left side with a circuitry design. "It represents the duality I feel trying to integrate tech into my biology," he says.Arden Wray for The New York Times

By Alice Hines

Photographs by Arden Wray

Louis Anderson, a 16-year-old aspiring biotech entrepreneur, eats dinner with an anarchist, a world-renowned tongue splitter and at least 30 people who have implanted themselves with magnets or radio-frequency identification chips, a.k.a. RFID implants, for fun on a recent Friday night in Tehachapi, Calif.

We're at Grindfest, an annual meetup of biohackers, and Louis has never met a single member of the community in the flesh before, although he's been planning the trip for two years. They have a lot to talk about.

Will artificial intelligence kill us or save us? Will global warming be worse than experts predict? When will the next financial crisis strike? What brings Louis here?

"I don't want to say too much," he demurs, the lanky high school senior as coy as anyone confident enough to defer college to start a company might be. "We could be competitors."

"We're transcending capitalism!" scoffs Michael Laufer, who helped publish free online instructions on how to create a D.I.Y. version of the perennially expensive prescription EpiPen, provoking a warning from the Food and Drug Administration. "Competition doesn't exist!"

Grindfest is named for grinding, a subculture I might describe as medical punk. Less than a decade old, it is the anti-establishment fringe of a biohacking movement that's increasingly in the zeitgeist, in the form of health and fitness trackers, "cognitive enhancing" coffee and vitamins, and billionaire-backed schemes to outwit aging. Grinders, too, aim to optimize the body — with scalpels more often than seed funding. Now in its fifth year, Grindfest isn't on the radar of the cowboys at the rodeo ground down

the road, much less the wider public. But that might soon change — people like Louis hope it will. “Building your own computer used to be really niche,” he says. “Now everyone does it. ”

A shelf outside the procedure room.Arden Wray for The New York Times

Louis — who talks at a speed he calls “2x,” for the YouTube videos on cryptocurrency he watches when he’s not winning science-fair prizes — is at Grindfest on business. By the end of the weekend, a biocoating of his invention will be attached to a glowing wire under the forearm of Hylyx Hyx, a self-described “submissive for science” who met Louis in a Slack group. Yes, glowing. That is, if all goes according to plan.

Hylyx is happy to serve as a test subject. “I’m used to having weird feelings about my body,” says the pink-haired 35-year-old. “I use ‘they’ pronouns. I don’t care about most of my meat, so this is a way to have control over a part that I chose.”

That night in the mountain air, a North Star shines — under the skin of Justin Worst, an archaeologist in whose hand the LED device was implanted. A dozen bodies curl together under blankets on a living room floor; more are in tents and in the backs of vans. A laundry alcove is strewn with circuit boards and soldering irons; in a 1980s garage-cum-laboratory, baby chicks chirp in a pen near the door. The mood resembles an alternate universe, what Silicon Valley might look like if a natural disaster had wiped the electrical grid for the entirety of the 1990s, or if Burning Man had devoured it rather than vice versa.

There are blunt knives rigged with shock wires for sport. There are scalpels, carefully sterilized. There will be blood, and a documentary crew that will hover around it. Perhaps this isn't our dystopian past, but an imminent future, biding its time in the mountains near the western edge of the Mojave Desert.

Vehicles parked around the Tehachapi, Calif., bungalow where Grindfest takes place. Grinders sleep in cars, tents and in sleeping bags all over the property for the duration of the weekend.Arden Wray for The New York

Times

Powerful people are betting on a version of it. In 2016, Elon Musk founded Neuralink, a start-up developing brain-computer interfaces to be implanted underneath the skull. Its technology is eight to 10 years away from use by the general public, per Mr. Musk; Jeffrey Tibbetts, a registered nurse whose home plays host to Grindfest, isn't willing to wait. Under the webbing of his thumb on both hands are RFID chips, enclosed in glass capsules. Mr. Musk, the founder of Tesla, says his device could enable telepathy and circumvent memory loss; Mr. Tibbetts's don't do more than open doors at the hospital in nearby Palmdale, where he works. But, unlike Mr. Musk's, they're in there.

"It's not good enough to talk," says Mr. Tibbets. He wears an eyebrow piercing everyday and scrubs during procedures. "You should be taking action. That's kind of our ethos." Near the lab, a group of understudies practices his techniques for suturing on a fleshy kombucha culture. Mr. Tibbetts is careful to emphasize what they are doing is not medicine or surgery but akin to body modification and piercing (the first two could be legally problematic).

In the driveway outside, Russ Foxx, a body-modification artist with puck-like horns, shouts after Louis Anderson Sr., who's carrying fruit into the house. "Are those bananas fully automatic?"

Mr. Anderson, a suburban dad in a Nike T-shirt who woke up at dawn to go into town and get everyone doughnuts, responds without a beat: "Yep, plug me in and get ready!" The two shared a ride together up from Los Angeles, organized by Louis.

Magnets and RFID implants are rites of passage among grinders. On the avant-garde, according to Ryan O'Shea, a former broadcast journalist who runs the podcast Future Grind, are powered subdermal devices, which could communicate things like blood pressure and sugar levels via

Bluetooth, and D.I.Y. gene therapies. Results of the latter have so far been mixed. Earlier this year, the creator of a purported hack for lactose intolerance scarfed down a cheese pizza at the end of a YouTube video. Another biohacker, who at a conference in February injected himself onstage with what he said was an untested herpes treatment, was last month found dead in a flotation tank.

On Saturday, as talks take place about wound care and prototyping, Louis is in the adjacent lab, dipping an electroluminescent wire — think a glow-in-the-dark shoelace — into a mucus-y mix. Hylyx is nearby, preparing magnets for other implants. The plan is, with Mr. Tibbetts's help, to insert the wire underneath Hylyx's skin, its coated ends extending from two incisions, for a period of three days, which will both be cool looking and a test as to whether the human body rejects the mixture, by, for instance, becoming infected. Louis hopes his coating, which he implanted successfully into nine of 11 mice over winter break as part of a science-fair experiment, and which garnered state and local prizes, might prevent infection in various scenarios: everything from futuristic charging ports, embedded in our skin, to the central-line IV wires currently used in hospitals.

Louis Anderson, a high school senior, working in the lab while his father, Louis Anderson Sr., looks on. Mr. Anderson traveled from Arizona and slept in a tent for the duration of the weekend to chaperone his 16-year-old son at Grindfest.Arden Wray for The New York Times

Buddy Ratner, a professor of bioengineering at the University of Washington, has spent two decades developing coatings and other strategies to improve the healing of implanted biomaterials and medical devices, and is skeptical. "I don't see anything in this particular brew that would solve the very difficult problem of how to heal the skin around transdermal foreign objects," he tells me after reviewing Louis's science-fair paper. "Although this is a high school student, so you've got to admire their motivation."

Professor Ratner's current project, a wearable artificial kidney that performs dialysis via a coated skin port, will take an estimated $200 million to bring to market, including costs associated with F.D.A. approval; human clinical trials are expected to begin in 2022, what the professor calls an "audacious" timeline for a project of this type. Louis's human trial begins tomorrow. "Where else can this happen but here?" he chirps.

If it sounds quixotic, so do other more well-funded biohacks. Ambrosia, a San Francisco start-up, offers an experimental anti-aging therapy in transfusions of young plasma (the cost for one liter: $8,000). Another, called Nectome, says it's developing a brain-embalming procedure which would allow thoughts and memories to be digitally brought back to life (the company also says it would have to kill you for the technology to work). The billionaire Peter Thiel reportedly expressed interest in the first company; Sam Altman, president of the start-up accelerator Y Combinator, paid $10,000 for a waiting-list spot with the second.

"How do I say this nicely?" considers Amanda Plimpton, who wears a circuit-print dress and a caffeine-molecule pendant. Her collective-turned-company, Livestock Labs, is developing implantable biosensors to predict diseases in cattle. "Those white rich dudes wanna live forever. So that's where they put their money. They don't care about other things."

Tim Cannon is C.E.O. of Livestock Labs, a company developing implantable biosensors for cattle, and, it hopes, one day, humans. "We're making our own future," he says.Arden Wray for The New York Times

Livestock's eventual goal is to bring its sensors to humans. Its C.E.O., Tim Cannon, started its predecessor, Grindhouse Wetware, after a stint in the military and a stint on the streets, and, finally, after a self-directed obsession with technology that he says pulled him out of depression. "You don't have to do it their way," he preaches from the garage's makeshift lectern. "We can predict diseases in your dinner but not your daughter, and it's *your* fault because you're a square."

Rich Lee, a grinder with dreams of turning his pelvis into a cyborgian vibrator, is in the front row. After he and his wife divorced in 2015, she sued for custody of their children. Mr. Lee has magnets inside his ears which act as headphones; shortly after his divorce, he attempted to implant his shins with foam armor, which ended in swelling, burst stitches and removal. His children, he wrote in a GoFundMe raising money for legal fees, "used to think I was an awesome dad with super powers, but now they have been told I am a self-mutilating parent with a problem and that they are victims for seeing the stitches in my legs."

Late Saturday, at a saloon a few miles away, Max Mata, a veteran in a cowboy hat who had never heard of Grindfest, contemplates the notion of electronic implants. He worries about privacy, like access to his Social Security number: "Could they get your social off that thing? No thanks."

"We made it available for dogs and they're not dying," counters his friend, Dakota Turney, a police officer.

"It's different when it's humans," says Lexie Armienta, a waitress. "Your body is your body."

"What about tattoos?" asks Mata. "We all have those."

A magnet and an electroluminescent wire in the Grindfest laboratory. Arden Wray for The New York Times

On Sunday morning, Mr. Tibbetts and Hylyx prepare to test Louis's coating. Overnight, the mixture has begun to crack around the edges of the wire. That wasn't the case in Louis's rodent trials, in which the coating dried smoothly around discs. "I don't think it's a good idea," ventures Mr. Tibbetts. "This wire is too flexible. If Hylyx's body rejects it, there's no way to know whether it's because of Louis's coating or something else."

"I want my arm to light up, but yeah," agrees Hylyx.

The Andersons are in Los Angeles, waiting to catch a flight back to Arizona,

when they hear the news via text. “If you fail once, try again,” says Louis. “That’s how I am.” Louis’s role model, the polymathic John von Neumann, tried his hand in a plethora of different fields. In June, the Andersons will fly to Shenzhen, China, to scout suppliers for his company.

Hylyx goes into the procedure room anyway, with a finger magnet that has been failing, which means the uncanny sensation of electromagnetic fields — “it’s like air has a texture,” someone says — has dulled. Underneath a bright fluorescent light, Hylyx pushes a scalpel into a finger; blood trickles down. “Doing it on yourself is easier,” Hylyx says. “If you make a mistake, it’s like, ‘Oh well.’ You feel it.”

Hylyx, who has been living in a lemon-colored converted bread truck for the past few months, doesn’t know yet where to travel tomorrow. Hylyx is considering installing a device that would link the vehicle to the entire world via radio waves, to talk to anyone in the world at any moment. It’s a technology that, 50 years ago, seemed like a superpower: the Wi-Fi hot spot.

A series of mailboxes along the road in Tehachapi, Calif.Arden Wray for The New York Times