The Gundersons get us ready for Basil, the robot of our dreams

By Joel Warner
published: December 18, 2008

Basilâ€™s debut at the Wynkoop.

Ken Byles and Bill Llewellin watch the Gundersons in their lab.

Louise and Jim Gunderson and Basil

Subject(s):

robots, Jim Gunderson, Louise Gunderson, Gamma Two

When people ask Jim and Louise Gunderson if they have kids, they reply, "No, we have robots." But right now, Louise feels like any other harried mother carrying a kilo of toys and bottles and diapers wherever she goes. Today is the first big day out for her little one, and she's brought along everything Basil the robot may need. That includes a laptop in case they have to mess with his code, an impressively large wrench and a couple of screwdrivers if they have to tinker with his hardware, an extension cord for when he gets hungry, and super glue — lots and lots of super glue.

The adhesive's already proven vital: A little while ago, one of Basil's wheels fell off and they had to glue the sucker back on. "I sympathize with people with kids," says Louise. "We're going to have to make custom carriers for all this gear."

They can't bother with that now, though. They're in the back meeting room of the Wynkoop Brewing Company downtown, and in just over an hour they'll be surrounded by the legion of science and technology buffs that get together here ten times a year for Cafe Scientifique, a wildly popular beer- and curiosity-fueled colloquium on far-ranging science topics. The Gundersons will have the spotlight, detailing their work at Gamma Two Inc., the tiny Denver-based robotics research and design company they started in 2003.

They're looking spiffy for the occasion, their long hair — Jim's is orange, and Louise's is brown with a streak of gray — tidily done up in ponytails. But they both know the real star today is Basil, their latest creation, here to strut his stuff.

In truth, Basil (his name rhymes with "dazzle") isn't all that exciting to look at. Standing just about waist-high, he resembles a shiny upside-down salt shaker on wheels. He has no arms, no legs — not even eyes, unless you count the twelve sonar banks flickering up and down his aluminum chest that capture a rough outline of his surroundings. But looks can be deceiving. Under the hood, Basil is hot stuff — maybe even revolutionary. The Gundersons claim to have possibly solved one of the most challenging problems in robotics, and just a few weeks ago, they published an entire book, *Robots, Reasoning and Reification*, about it.

Most autonomous robots today may be good at a specific, pre-programmed trick or two, like acting like a cute dog or walking up the stairs, but they can't do anything else. The Gundersons promise that they can fix that, that their robot will be able to accept new commands, reason out ways to complete them, and then go out and do them. Want the robot to dust the bookshelves? No problem. Want it to set the table? Easy. Want Basil to fetch a beer? Well, that's exactly what the Gundersons hope he'll do today.

The plan is this: The Gundersons will ask Basil to go to the bar, request a couple of stouts from the bartender, and then, once they're placed on the titanium tray perched on his head, bring them back to his creators. They haven't told him how to do this — there's no set script in his processors that tells him to roll a certain distance southwest, speak a certain command, then come back. He'll have to figure it all out on his own, using a basic knowledge of bars and beers and so on, reasoning skills and an ability to understand certain parts of the world. When his sonars capture the image of a person, for example, he knows it's a person, not just a nameless object to be avoided. And he knows that, in this case, that person wants a beer.

"This is the first time Basil's been out with his brains intact," Louise notes, adding that they've never had him complete complicated tasks in public before. When they brought him out for their recent wedding anniversary party, for example, they turned off his higher-level brain and had him dance around by dumbly bouncing from one lady to the next — the way most guys function on the dance floor.

Today's demo is far more challenging. It will be one frothy beer for Basil, one giant champagne-worthy accomplishment for robotkind.

That is, if all goes as planned — which, right now, it isn't. When the Gundersons power Basil up to check his hardware, his sonars unexpectedly go out. They fix that, but then the robot starts spinning in circles. That bug gets taken care of with some help from the Friends of Basil, a few of the Gundersons' acquaintances who volunteer to help out on the robot — the closest thing that Gamma Two has to other employees. But then a bigger problem arises: When asked to go to the bar and introduce himself to the bartender, Basil speeds off in the opposite direction, charging toward a couple of early birds sitting in the front row. "Now I'm officially nervous," says Louise.

"We have plenty of time — it's not like people are walking in," Jim replies sarcastically, gesturing to the crowds already filing in.

Jim and Louise have both been in the robotics industry long enough to know a cardinal rule: Live robot demos don't go as planned. They've had a computer-controlled vacuum cleaner kamikaze itself into the nearest wall. They've showcased a robotic walking frame, a device designed to help the elderly get around, that steadfastly refused to avoid obstacles in its path. So who knows — maybe Basil will get stage fright.

With just minutes left before go-time, the couple realizes what's wrong. Jim had accidentally switched two coordinates when he loaded up Basil's concept of the Wynkoop, making the robot mistake left for right. Jim plugs the laptop into Basil's computers and hurriedly resets the code. It looks like everything's all right — until a member of the Friends of Basil realizes something else: "Basil's not 21. Will they serve him?"

They'll just have to find out.

Whenever Basil's turned on, it takes him a while to come to his senses, as if he's recovering from a long night at the bar. "Did you turn me off again?" he mumbles to no one in particular in a flat, digitized voice that resembles Stephen Hawking's. No need for an answer; he knows he's been out cold and has already begun his wake-up routine.

First he tests his hardware — the equivalent of us wiggling our toes. His main brain, a low-end desktop computer perched on a platform beneath his serving tray, sends test signals throughout his body, through the low-level computer chips one platform down that comprise his brain stem and spinal cord to the motors that power his wheels and the twelve sonars that blink like Christmas lights across his chest. He also checks the voltage on his twelve-volt battery, to make sure he's not hungry. If everything looks good, he announces triumphantly, "I have a body."

It's about a month before the Cafe Sci event, and that body is standing unabashedly naked in the Gundersons' lab. His shiny exterior skin has yet to be fabricated, so his internal tangle of wire and circuit boards is exposed to the world — in his underwear, as Louise says.

Next, he scans through his memory, how the Gundersons have been having him roll this way and that, practicing his obstacle avoidance so he'll be prepared for the Wynkoop's crowded confines. "Initialized episodic memory," he says when he's done, but then seems to realize something. He vividly recalls where he was the last time he was operational, but Lord knows if he's still there. "Where am I?" he asks, almost nervously. The Gundersons tell him by typing the answer into his computer.

Ah. The lab. He knows the lab, the Gamma Two headquarters appropriately located in the Bolt Factory Lofts, a renovated bolt manufacturing plant on South Kalamath Street. If he had nostrils, he'd whiff the aroma of brewing beer wafting over from the nearby Breckenridge Brewery mixed with roasting coffee beans from

Dazbog Coffee. He knows this chic industrial space decorated with old toy robots like the back of his non-existent hand; how the two computer workstations, desks covered by sheets of paper tattooed with penciled-in equations and graphs, stand at one side of the room while the mini-machine shop, the work bench and tool cabinet and shelves of electronic miscellanea, occupies the other. In between, he's free to roam about; the only place that's off limits is the second-level office, where bookshelves overflow with treatises on computer programming and neurophysiology, and that's only because he can't navigate stairs. Yet.

Assured everything is in its proper place, the little guy is ready to roll. "My name is Basil," he declares. "What do you want me to do?"

Basil is confident there are people in the room to instruct him. He knows what people look like and that he's supposed to serve them and that he shouldn't run into them. But he has no idea what these particular people plan to teach him today, a list of Cafe Sci-specific functions listed on one of the lab's dry erase boards:

"Apologize to people."

"Ask for beer."

"Don't trip."

And since he doesn't have ears, he can't follow their conversations, a heady concoction of computer science, electrical engineering, neurology, psychology, philosophy and sociology, topped with a dollop of science fiction — but then again, even the average human would have a hard time keeping up.

His memory of these folks is spotty at best. He's pretty certain they're not standing exactly where he remembers they were the last time he was operational, since he's aware that people are more transient than, say, one of the lab chairs, which sometimes get moved, not to mention the walls or workstations, which he knows never move. But he draws a blank about their personal lives, their background and motivations.

He knows nothing of how Louise, then a chemistry undergrad at the University of California, Berkeley, met Jim at the San Francisco magic shop where he was working in 1977 or how they hit it off over discussions of Einstein's gravitational-field theory. It was a match made in intellectual heaven. "If these two get together and start something, everybody had better stand back,'" Robin Felder, a pathology and chemistry professor at the University of Virginia, remembers thinking about the two former UVA grad students. "My mind doesn't completely comprehend how that much intelligence can interact."

Gamma Two, which uses the Greek word for the letter G to reference its founders, Gunderson and Gunderson, is dotted with examples of the couple's accomplishments, beyond the two Ph.D.s, two master's and three bachelor's degrees they boast between them. On the wall, near a poster of a drunken robot that reads "A sober robot can't do his job. He depends on your beer!" is a patent for an automated medical-sample freezer Jim designed; its robotic machinery operates at -80 degrees Celsius. And in the corner, there's Kitty, a low-cost hazmat-monitoring robot they developed — built into a blazing pink Barbie Power Wheels car.

Basil is just a few months old ("I went into service on October 15, 2008, at the Gamma Two Facility in Denver, Colorado, USA, Earth," he'll say in an ode to HAL 9000, the creepy supercomputer in *2001: A Space Odyssey*). And he's only a hodgepodge of parts from Home Depot and Radio Shack, a thrifty provenance that's allowed the Gundersons to work on him for four years using savings from lucrative past projects, such as the software they developed that played the stock market for hedge fund managers. But simple little Basil could be their most important creation.

"Our motivation is, 'Where is my robot?" explains Jim. "For fifty years, sixty years, they've been promising us our robots. The personal servants who are going to clean our house, walk the dog, do all that kind of stuff. We want Rosie from the Jetsons."

The Gundersons aren't the only ones who dream of a servicebot. As the baby boomers shuffle into their golden years, helpful automatons that allow the elderly to live at home longer could prove to be hugely cost-effective, given the price of nursing homes.

But until now, no one's figured out how to make such robots work, despite the fact that the world already has the hardware to do it. On one side are the amazing bots that stick to simple tasks. An automated car built at Stanford University made headlines in 2005, for instance, by winning a driverless-car competition, successfully navigating a 132-mile off-road course in under seven hours. Then there are the 2.5 million Roombas, the robotic vacuum cleaners that scurry about floors all over the world.

On the other side are the computers with robust artificial intelligence. In 1997, Deep Blue, a chess-playing computer, beat world champion Garry Kasparov and became the best player in the world. And Jim, for his dissertation, developed a computer program that could deliberate. When given a task, the software cycled through every action it knew how to do, picked the most suitable ones and figured out in what order to do them.

But when such AI is installed on robots tasked with getting stuff done in the real world, things get messy. Deep Blue, for example, knows how to move a knight piece on a chess board better than any human, but it doesn't actually know what a knight *is* — or, for that matter, where to find such a piece in a cluttered cabinet full of board games.

"We want robots that we can tell what to do and they'll figure out how do to it, and if something goes wrong, they'll figure out how to fix it or come back and ask for help," says Jim. "Complications, no problem. Changes with the world, no problem."

So far, that goal's been a pipe dream.

That is, the Gundersons say, until Basil came along.

There's a problem. Not a big problem, but a problem. It's just two weeks before the Cafe Sci meeting at the Wynkoop, and Basil is completely lost. He's still moving around, rumbling from one point to the next when he's told to, but he never ends up at the place in the lab where he thinks he is. The Gundersons know his location is off because they've measured out the distances in their lab to the millimeter.

So they stay hunched over their computers, tinkering with code before plugging Basil in and downloading minute revisions. But the glitch won't go away; every time they seem to iron out one wrinkle, another one pops up. It's one of the many headaches of nuts-and-bolts robotics — while purely software-based artificial-intelligence programmers can run thousands of software tests to root out bugs almost instantaneously, fixing Basil means endless hours of slow, careful trials. After the latest round of fiddling, Basil seems more perplexed than ever. When directed to move across the room, he turns a bit and shuffles forward a few inches — then stops. "What would you like me to do?" he asks, believing he's somehow teleported himself clear across the workspace.

"That's even weirder," remarks Louise, sipping a cup of smoky oolong tea — the couple's umpteenth of the day. "I must have really broken something." Over the lab speakers, a chipper Christmas tune plays — one of many the "Personal DJ" software the two designed has been spinning lately. The AI program has learned enough about the couple's musical tastes to mix things up, but ever since Jim, in a bout of seasonal cheer, uploaded a bunch of holidays tunes, it just can't seem to help itself.

"Golly, golly, golly," says Jim, who is wearing one of his endless variations of vests with a button-down shirt. They'd finally got Basil's internal compass working, and now this. They haven't even begun to teach him what a bar is or how, in order to obtain beer there, he first needs to get money, know how many beers to order, get himself to the bar and know what kind of beer to ask for (the Gundersons prefer stout). It looks like there won't be time now to add a voice interface before the show, so they'll have to make do with commanding Basil via a wireless keyboard. And don't even get them started on the fact that Basil's wheels keep falling off.

Still, all things considered, they're relatively calm. "We're those evil science types," jokes Jim. "We don't have feelings."

Or maybe it's because Basil, despite the current setback, already has the ability to identify, reason about and then interact with items he may find in a bar — a feat that his creators believe is the hardest problem of all. To

figure out how to make Basil do this, the couple pondered some of the most advanced robots around, like unmanned military airplanes and the Mars rovers. These machines handle complex tasks with ease because they rely on a human — someone watching video feeds and identifying for the robot what objects are relevant to its mission and how to handle unexpected developments and so on. The Gundersons were very familiar with this sort of tele-operated robot, having strapped a video camera to a remote-control car and remotely chased cats around their back yard for kicks. But what, exactly, did they, the humans, bring to this person-robot relationship?

Their contribution, the Gundersons decided, was helping the robot simplify and understand all the miscellaneous data with which it's bombarded at any given moment.

"It occurred to us that the key thing that we are doing is taking the little dots on the video screens and turning them into 'chair legs' and 'doorways' and 'cats' and then coming up with a plan about them," says Jim.

It's as if people are living in simplified virtual realities, where they filter out the vast majority of information around them — light gradients and subtle odors and ambient sounds — and just focus on basic abstract concepts. The Gundersons found a quote from twentieth-century philosopher C.I. Lewis that put it well: "We do not see patches of color, but trees and houses; we hear, not indescribable sound, but voices and violins."

The Gundersons call this process "reification," a term they borrowed from philosophy, meaning to mistake an abstract idea for a real thing. They believed they could mathematically model it. If they could program a robot to symbolically identify objects by focusing on just a few key attributes, like basic shapes and sizes, and ignore everything else — just as people do — the machine would be much more adept at navigating its complex and dynamic world. Furthermore, since the robot would be able to recognize objects in his surroundings, the Gundersons could teach it basic attributes of these objects so it didn't see them as general obstacles or targets, but as abstract concepts like people and chairs — abstract concepts that computers are good at reasoning about. Finally, such a robot would be able to store in its memory a basic symbolic mock-up of what these objects look like and where they're located so it wouldn't have to continuously rebuild its concept of the world every time it moved or interacted with it.

Reification, the two believed, was the missing piece between advanced robotics technologies and artificial intelligence. They wrote their new book all about it, but they still had to prove it worked. How do you code something humans do without thinking? How do you figure out which aspects of a chair a robot should focus on to determine that it is, in fact, a chair?

The answer was in teaching the robot to look for the most simple clues imaginable — that a lamp emits light, for example, or that a person has two legs. The Gundersons purposely designed Basil as primitively (and inexpensively) as possible, opting for sonars over video cameras because they figured if they could get reification working on a system as basic as this, they could do it anywhere.

The first trials, however, failed miserably. Jim, using drawing software, sketched up a beautiful three-dimensional model of a chair and uploaded it into Basil's brain — but the robot couldn't, for the artificial life of him, identify chairs in the lab. The problem, they discovered, was the vagaries of the image captured by the sonars never looked like the perfectly designed chair model — so, says Louise, they decided, "Why don't we just have the robot record what it sees?" They instructed him to take sonar image after sonar image of a wooden lab chair, capturing how it appeared from every angle. Then they spent days poring over the data, identifying basic characteristic patterns, like how the chair is waist high and always has legs and a straight back — basic patterns Basil could use to determine whether a given object is a wooden chair.

Then, with the work finished this past June, they wheeled a chair in front of Basil and asked him what he saw. Using the chipper dialogue they'd programmed, he announced, "Ooh, I see a wooden chair."

The regulars that night at the Denver Press Club, the Gundersons' favorite bar, didn't know what to make of the two scientists throwing down beers and dancing around chanting, "The robot saw a wooden chair!" But that's because they had no idea what this development meant: Reification worked. And with that, this tiny robotics lab started making waves.

"The reification work they have done is unique. There hasn't been a book on the subject anywhere else, and I consider them leaders in their field," says Raj Madhavan, a researcher at the Intelligent Systems Division at the National Institute of Standards & Technology in Gaithersburg, Maryland. "And some of the things they have been doing, the reification work, hadn't been implemented on a robot, per se. They have what looks like a toy robot, but it has a cybernetic brain design."

Soon Basil wasn't just identifying wooden chairs, but other types of chairs — followed by tables and even people. Now when the Gundersons show him a chair he's never seen before, he's can figure out that it's probably a chair and definitely not, say, a person or a table. Once the couple repairs Basil's little mobility problem, they expect him to be able to approach an unknown object, mosey around, scrutinize it for a bit, then place a basic mental model of the object in its memory for later use.

Basil, in other words, will be able to learn on his own.

The members of the Friends of Basil can hardly contain their enthusiasm. It's T-minus four days until Cafe Sci, and the excited crew hovers around Basil, screwing in components and cracking *Star Wars* jokes. When they step back, the robot's dressed head to theoretical toe in gleaming, marbleized aluminum.

"Ta da!" says professional jeweler Guyotte Williams, whom, as the designer of Basil's outfit, the Gundersons call the world's first robot aesthetician.

"Damn, he scrubs up nice," says John Morse, a machine shop owner who runs the Grand National Critter Crunch Tournament, a local robotics competition.

"This is a momentous occasion," adds Louise as the team imagines other dress styles, such as a black-velvet Basil for Elvis lovers.

The robot still has a few programming kinks, but as Christian Brown, a maintenance supervisor at the University of Colorado Denver who's the team's so-called chief roboticist puts it, "Even if he doesn't deliver the beer, people will say he looks good."

Basil has to look good; it's part of the Gundersons' marketing plan. The couple's nest egg isn't going to subsidize their research forever, and, as Louise says, "We gotta find a way to fund this. We're addicted to this stuff." So sometime next year, they'll start advertising Basil construction kits in publications like *Robot* magazine and *Make* magazine so that tinkerers the world over can build their very own reifying robot. Then, a few months later, Gamma Two will hit the cocktail-party industry with the unveiling of hors d'oeuvre-serving Basils. And no one's going to want a canape from an ugly bot.

Hence Basil's glossy, stylish and, most important, completely non-humanoid look. "There's something about robots, a certain creepy factor," explains Morse. "If they're humanoid but not quite human, people stand off from them."

He's referring to the phenomenon of human facsimiles, such as robots and animated figures, becoming more disturbing as they become more lifelike. It's why a roaming tabletop like Basil seems cute, while the hyper-realistic human animations in the computer-animated film *Polar Express*, for example, are downright disturbing.

It's also in the spirit of positive human-robot relations that the Gundersons refer to Basil as a guy. They're not in danger of mistaking him for a friend — they promise they'll have no problem killing him if he stops working right — but they do believe that slapping a gender on him will help him fit in with those who care about such things.

"He is designed to function in a world that is shared with humans," explains Jim. "People are going to build human models of what he is doing."

And there was no question about Basil's sex. The way he aggressively zooms up to people without regard to

personal space, he has to be a man. A pretentious European man, to be exact, considering how his stiff mannerisms suggest he likes to haughtily turn on his heel and huff away. That's why he has a snooty name like Basil.

When the Friends of Basil finally quit fawning over the robot's new clothes, it's on to the next order of business: planning the upcoming Gamma Two online marketing video, "Basil Nabs a Burglar." The Gundersons have discovered their creation may have another application. Since Basil's sonar allows him to see perfectly in the dark and because he knows when objects around him are removed, he'd make a great security bot. To promote this concept, Friends of Basil member Ken Byles, the robot's videographer, will film a sketch in which Basil discovers a bandit in the lab, remotely calls the cops, and then, when the scofflaw attempts to flee, warns him, "Don't make me tase you."

It's a good thing the Gundersons always keep a bottle of champagne chilling in their home fridge. Tonight calls for a celebration.

"We're ecstatic," says Jim, before stepping out the back door of their Denver bungalow and popping the bottle's cork into the night. At the lab today at about 4:30 p.m., with just one day left before the Cafe Sci event, they asked Basil to deliver tea to them — and he did it. Yes, they had to place the teapot on his tray after he popped into the lab's kitchen to get it, and they had to pour it themselves once he presented it to them, but that's just because he doesn't have arms yet. The point is, the bugs are gone. He works.

Now all they have to do is replace the tea with a nice frothy beer, and the sky's the limit. First the Wynkoop, then the world. Yes, many challenges lie ahead, like replacing Basil's sonars with much more complicated video cameras, making sure he doesn't get overwhelmed by all the different objects he'll have to eventually identify and figuring out the mind-bending dilemma of teaching a robot to understand informal English. But they're cautiously optimistic. "Everyone wants to leave a legacy," says Louise; maybe this will be theirs. "If we're really lucky, Basil will be as influential as an Apple," she adds as they sit by the fireplace, sipping bubbly.

So let's say the Gundersons do deliver the handy-dandy robot everyone's always wanted. Is that necessarily a good thing? For starters, the specter of people using such machines for bad purposes — programming suicide-bomber Basils, for example — gives Louise heartburn, to put it mildly. And what about the helpful bots Basil could spawn, the ones that learn to complete any task, large or small: Will they enrich people's lives or just make everyone super lazy? The television remote control led to the couch potato, and the Internet gave rise to the web addict. Will a real live Rosie the Robot Maid turn everyone into the blubbery do-nothings depicted in the movie *WALL-E*?

The Gundersons have thought long and hard about these questions, and they're not ones to take the social ramifications of new technologies lightly. In their own home, they're only willing to embrace new gizmos if they're sure the benefits outweigh the disadvantages. By the time they were ready to purchase a VCR, for example, the technology had given way to DVD players. And other than an in-home version of their Personal DJ software, all of their robots are reserved for the lab.

But the Gundersons are optimistic that one day soon, they and many others will welcome Basil's ilk into their homes, and it won't be the end of productive civilization. Sure, "some people are going to turn into lumps," but they'll be outnumbered by all the people who really need robotic helpers, Louise says, folks like the Gundersons' ninety-year-old acquaintance who, when she learned about the couple's preliminary work on Basil, remarked, "Why didn't you start working on this twenty years ago? I need this *now*."

Best of all, say the Gundersons, this brave new roboticized world will let folks focus on the finer things in life. In their own case, maybe they'll get back into chasing tornados, a hobby they pursued for five years not just for the thrill of it, but for the near-impossible mathematical challenge of predicting where the twisters were going to hit. Or maybe they'll hit something else on their to-do list, like visiting a live volcano.

And if their grand plan fails? "We'll have robots panhandle for us on street corners," says Jim. "They'll have signs that say 'Will work for voltage.'"

Basil's coming-out party at the Wynkoop bolsters that old cardinal rule in robotics: Live demos don't go as planned.

Things start off promisingly. Halfway through the presentation, Jim says to Louise, "Let's ask him for some beer and see what happens." She types on Basil's wireless keyboard, and he dutifully asks how many beers and what type. Then, after remembering to request some money, he trundles off toward the bar. Unfortunately, still twenty feet away, he slows down. Then slows some more. Finally, he stops completely.

Another glitch? Not this time.

It turns out the Gundersons left Basil on too long, and he's running out of juice. Soon, his sonars start flickering, as does the computer screen on his backside. "This," Jim announces matter-of-factly, "is Basil starving to death."

"Awwww," exclaims the audience as Louise hits the "off" switch — but no one seems too put out. After all, the Gundersons' account of their work has enough whiz-bang moments even without a beer-slinging robot. Jim, his days on a magic stage shining through, has the crowd from the get-go when he inquires, "How many of you have asked, 'Where's my robot?'" — and nearly every hand shoots up. Later, the awe in the room is almost palpable when he says, to help explain reification, "We don't live in the real world. We are all living in a fantasy world. You are living in a model of the real world."

They finish to rousing applause. As audience members surge forward to inspect Basil, Louise takes stock of the event. No, she's not too disappointed: "Because we were working on a deadline, it forced us to get a lot done." Now, thanks to the inspiration of Cafe Sci, they know Basil's brain works perfectly. He's been delivering tea all around the lab, not to mention a few beers. The mistake tonight wasn't the robot's, it was the stupid humans'. Plus, it's great to see her scientific peers fawning over Basil.

"We work in isolation," she says, "So it's nice to hear it's cool."

Still, the two are already pondering their next assignments. They have to teach Basil to recognize specific rooms, so he doesn't keep asking where he is all the time. And he has to get real peepers, in the form of video cameras. Finally, there's his graduation assignment: Roll down the street to Breckenridge Brewery and bring back a growler.

Of course, before all that, says Louise, "we have to re-think batteries."

But that's all for another day. Right now, the Gundersons and the Friends of Basil head for the bar. It's time for a beer.

This time, they'll get it themselves.

Cafe Sci: When Nerds Unite

By Joel Warner
published: December 18, 2008

Subject(s):
Cafe Scientifique, J. John Cohen

If anyone can make dirt fascinating, it's J. John Cohen. That's why a recent meeting of Colorado Cafe Scientifique, a popular free seminar that takes place ten times a year at the Wynkoop Brewing Company, was standing room only. Everyone was there to listen to Cohen, an immunologist at the University of Colorado Denver School of Medicine, explain how our lack of muck-filled surroundings is making us sick — in a way that doesn't make the crowd fall asleep in their beers.

Cohen, who won an Excellence in Teaching award nineteen years straight for his lectures, breaks the ice with a Large Hadron Collider joke, noting that the new underground particle-accelerator behemoth may span both France and Switzerland, but that the cafeteria is beneath Switzerland, "where the food is better."

Then he launches into the Hygiene Hypothesis. He describes how our modern, urban and clean environments are weakening our immune systems so that they're attacking beneficial organisms, pollens and foods as if they were hazardous, leading to rampant allergic and autoimmune diseases.

In other words, forget the ten-second rule for picking up food on the floor: "I have a week-and-a-half rule. As long as it's still recognizable, go ahead and eat it," he says.

Cohen founded Colorado Cafe Sci six years ago, and there are now 75 Cafe Scis around the country; he borrowed the name from a similar British program. The idea is that a casual, liquor-fueled approach to cerebral topics — sort of like the European salons of yesteryear — is a perfect way to get Americans thinking.

"In the dumbing-down of society, people who want to use their brains are left out in the cold," he says. "There are many people who are smart and educated but find themselves in a day-to-day routine that doesn't value them as thinking people."

And since the Front Range boasts one of the highest concentrations of science and research labs in the country, he knew there were plenty of thinkers around.

The Tuesday-evening events regularly draw 100-plus people despite no advertising aside from a website, www.cafescicolorado.org. Cohen and his co-advisor, Helen McFarlan, are now planning another series titled Cafe Pedagogique to get science teachers talking in the same informal atmosphere. He even has a grad student writing her thesis about the academic implications of Cafe Sci's success.

In six years, brags Cohen, who was recently named one of the *Rocky Mountain News*'s 150 unsung heroes for his work on Cafe Sci and the CU Mini Med School, his other wildly successful lecture series, he's never had a dud. Not the presentation on dark matter, or Denver DA Mitch Morrissey's chat about DNA forensics.

And on the evening he discussed dirt, Cohen wrapped up with an account of what he calls one of the "most extraordinary experiments in the last ten years": In 2002, researchers were able to drastically reduce the effects of certain debilitating stomach diseases by repeatedly feeding patients milkshakes of liquefied pig whipworm eggs.

Surely after that scrumptious tidbit, everyone was hungry for some grub.