

Fascia Insights

Interstitialium and Complexity Theory

By Lorraine Fauve, Certified Rolfer™, and Neil D. Theise, MD



Lorraine Fauve



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ABSTRACT *In this rich conversation between Rolfer Lorraine Fauve and interstitium researcher Dr. Neil D. Theise, they focus on the discovery of the body-wide human interstitium – a fluid-filled connective tissue network – and its relationship to fascia, complexity theory, and holistic health traditions.*

Editor's note: The conversation took place on Thursday, February 20th, 2025. It has been edited by the authors and SFI editors for clarity and style. The biographical information has been updated for the June 2025 printing.

Lorraine Fauve: Hello Dr. Theise, and thank you for doing this interview with me. As a Rolfer, I am so intrigued by your research. I imagine many people in our Rolfin^g® Structural Integration community are already aware of your writings and presentations on various popular podcasts. And those who don't yet know you will benefit from getting to know you and your work.¹

You are a diagnostic liver pathologist who, as of May 1st, 2025, is retired from a long and productive career as a Professor of Pathology at the NYU Grossman School of Medicine. Let me

start by congratulating you on your recent retirement and move to Portugal.

For this article, we are going to focus on your research regarding the anatomy of the human interstitium (Benias et al. 2018), and perhaps we will touch on your 2023 book about complexity theory.

I heard about your discovery of the interstitium when it was featured on the popular podcast *Radiolab*. In their episode called “The Interstitium” [Nov 23, 2023], the journalists showcased how your work with a team of gastrointestinal endoscopists led to the discovery of fluid-filled channels inside tissue, and how these channels are a part of a continuous network throughout the body. It was suggested that the interstitium was a newly discovered organ and “a bridge between ancient and modern medicine” [Radiolab Podcast 2023, online].

The *Interstitium* is:

“a form of interstitial space in which interstitial fluid or ‘pre-lymph’ accumulates or forms” (Benias et al. 2018, 3).

It is a fluid-filled space that is supported by a collagen lattice.

- Compressible.
- Distensible.
- Shock absorber.

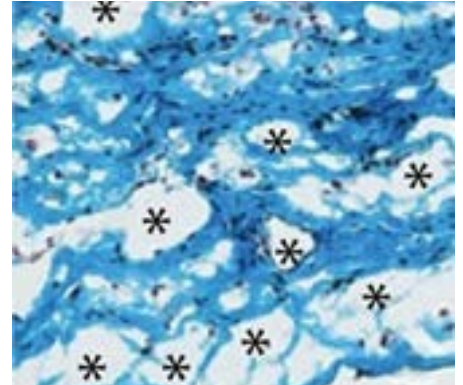
Fluid flow in the interstitium is subject to cycles of compression and distention, also noted to be affected by perfusion cycles of the body and the function of specific organs.

Constant movements that result in continuous and cyclic compression and distention in the interstitium can be found in:

- The lungs.
- The aorta.

Intermittent compression and distention in the interstitium of:

- The digestive tract after a meal.
- Urinary bladder during micturition.
- Skin under mechanical compression.
- Fascial planes during the action of the musculoskeletal system.



Microscopic view of a section of bile duct from Dr. Neil D. Theise's 2018 interstitium article, where the asterisks (*) indicate the fluid-filled tubes of the interstitium dispersed among the bands of collagen bundles (Benias et al. 2018). No changes have been made to the image. Permission was granted under Creative Commons Attribution 4.0 International License. To view the license, visit <https://creativecommons.org/licenses/by/4.0/>.

Complexity Theory

To quote Dr. Neil Theise (YouTube 2017):

“I started getting interested in self-organizing systems, which come under the heading of complexity theory when you're talking about living systems, and some non-living systems.”

Complexity theory “is how individuals, if there are enough of them and if they fulfill certain criteria, they will self-organize into larger-scale complex structures.”

Example: Ant Colonies

- Within an ant colony with a multitude of individual ants running around, no individual ant is planning what is going on in the colony.
- Each ant pays attention to the local environment and the signals of the other individual ants.
- By responding to their environment, they start to self-organize into food lines, building structures, having a cemetery, and having a dump for refuse from the colony.
 - Higher order events.
- Seems to happen spontaneously in a bottom-up direction.

“It turns out the cells of the body are like that, as well. Each cell in your body is not paying attention to what everyone is doing. There is no master-planning cell that's telling all the other cells what to do. They pay attention to signals from other cells, they pay attention to the temperature, the nutrient supply, all sorts of things. In those interactions, you get the neighborhoods of the body forming. The different tissues, the different organs, etcetera.”

These quotes and information are all from the Science and Nonduality YouTube video “Everything Only Looks Like a Thing: Neil Theise,” which was published on September 1, 2017.



Photo by EyeEm Mobile GmbH with [istockphoto.com](https://www.istockphoto.com).

Before we dive into the details about the interstitium, I want to ask first – what inspires you to include perspectives from holistic and Eastern medicine practices in your conversations about anatomy and the interstitium?

Neil Theise: Yes, thank you for your well-wishes. And to answer your question, yes, I do like to include them to some extent or another, and I always have had integrative thinking. I'm writing about this for my next book, which is underway. Let me illustrate my perspective by telling you how I talk about it with graduate students in biomedicine. I have them think about their reasons for getting their PhD or their medical degree and PhD. They may say things like, "Oh, I had a grandparent die of cancer, and I want to find a cure." Or, they are entrepreneurial and they want to invent something that will make them rich and help people. Or, they dream of a Nobel prize. There are lots of well-organized reasons. But the majority of people who are doing science, if pressed, can think back to their younger self, and it started off as some sort of intimate connection with the world around them.

If you have this kind of experience in childhood and your brain is wired to do math or science, those studies in school often lead a young person to think that science is a way to explore that curiosity about the natural world. I think that spark happens very early in our lives. It's instinctual. I don't think people want to become rich and then think they need to invent something, so they go get a PhD. The urge to do science comes first, and then people start to attach ambitions to it as they get older.

I had that kind of experience early in my life, this sense of an intimate connection with the natural world, and very much through my parents, the feeling had a spiritual component as well. I never got the memo that said those two things aren't compatible with each other. That's where my integrative approaches first appeared, I think.

LF: Which is so great. It's inspiring to hear you weave these ideas together – that science can also have a broader experience for people.

Meditating Scientists

NT: I did an informal experiment once with a stem cell biology graduate program. A friend of mine invited me to speak to

her students. I said I wanted to talk about the complexity theory stuff that is also my interest. She said, "Yes, that's okay." Then I said, "I'd even like to try it as a guided meditation," because I had done this for my Zen meditation group when I talked with them about my complexity theory. I had also presented it this way for some yoga groups, and it had been very profound for a lot of people. So, I thought, "What if I tried to do that with graduate students in stem cell biology?"

There were about twenty students, and I told them what we were going to do. I gave the reason for the meditation as wanting to help them recall and reconnect with their initial impulses to study science. Immediately, there was a whole bunch of people in the room with their arms and legs crossed defensively, and some eye rolling.

I had them uncross their legs, unfold their arms, sit up, close their eyes, and invite their attention to follow their breathing. It was a basic intro to meditation, to experience their body breathing. Then, I launched into the talk. When I got to the part of my talk where I discussed the body at a cellular level, about how your boundaries are not at your skin, they are further out there, where you leave your microbiome, where you have left your shedding skin cells.

When you go down in scale, what you think of as boundaries expand outward. I invited them to sit with their back upward, close their eyes, and follow their breath, then I guided their inner vision to feeling and experiencing their body as cells, then as molecules, at which they are one with the entire biomass of the planet. Then at the atomic level, you're one with the whole planet, all of its atomic substances, without separation. Finally, down at the quantum level, where we're without boundaries, the universe is our boundary, and all of us are inside.

There was a marked change in the energy of the room. Afterwards, a number of students came up to me and thanked me because I had reawakened that passion for science. What was more impressive were the emails I got later from those who didn't want to talk face to face. So, when it comes to science and spirituality, it hasn't been an either-or kind of thing for me. When I was younger, I used to think I was supposed to keep them in two separate boxes, but not anymore.

LF: A lot of people think of science and spirituality as very separate.

NT: Some people think, "No, the spiritual doesn't exist; it's only a material universe." Our culture pushes that hard. Other people are the reverse. And others beyond that live with significant cognitive dissonance. For example, we can insist on a materialist understanding of existence all we want, but then someone you know dies, and there's an experience of feeling their presence, and the world view has to shift – something impossible becomes possible – until you talk yourself out of it or forget how vivid it was.

I had my own very vivid, direct spiritual experience in my Zendō² one morning that was hard to deny. The complexity stuff I was studying became the Buddhist stuff, and vice versa. I realized, "Oh, these are not two different things. They're just two different views of the same thing." There was no shaking that experience from my memory. So, from then on, I always considered both – or even multiple – views. That was the context into which, when we came up with the interstitium anatomy, this is how I was already thinking.

Benias et al. 2018 Interstitium Paper

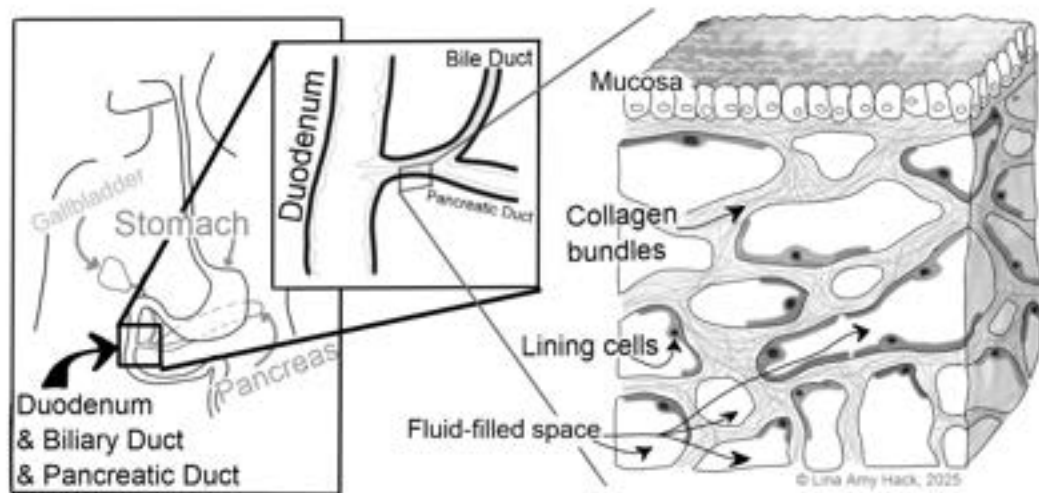
LF: Yes, I was wondering how your discovery and research of the interstitium has affected your way of looking at the world.

NT: That experience in the Zendō was around 2005, and our first interstitium paper was in 2018 (Benias et al. 2018). So, I was already thinking that way about complexity theory and its implications for how many different ways there were to view the human body when we published about the interstitium. But I didn't leap from the interstitium to other healing practices right away.

What happened was we published our findings on the anatomy of the interstitium and then people in other traditions said to me, "Oh, that's what I've been talking about for years."

Our original paper did not actually say the interstitium is an organ, and it didn't say that we were discovering the interstitium. The title said that there was a *novel* interstitium that hadn't been described in the allopathic literature before. Because we were using the new tool, probe-based confocal laser endomicroscopy (pCLE), to look at live tissue in the extrahepatic bile ducts and pancreatic ducts, the fluid-

Neil Theise: Our research group has come into this conversation to say that within dense collagen layers of the body, it turns out there are these fluid-filled spaces. And when you're doing *in vivo* microscopy, you can see them live.



By sending the probe-based confocal laser endomicroscopy (pCLE) into the duct shared by the gallbladder and pancreas, Dr. Theise and his research team were able to describe *in vivo* fluid-filled spaces surrounded by collagen bundles, deep to the mucosa layer of the duct (Benias et al. 2018).

filled spaces were still intact, and we could characterize them *in vivo* for the first time. Previously, the very same tissue was described as the “dense structure of the submucosa” and that it “represents an artifact due to loss of fluid during tissue excision and fixation, causing normally-separated collagen bundles to collapse and adhere to each other” (Benias et al. 2018, 2).

Now that we have this living tissue imaging, we can see the fluid spaces. And we can say that these tiny little cracks of spaces in dissected tissue that have been fixed for viewing on a microscopy slide – the ones we thought were artifacts [phenomena due to the fixation and slide processing] – are actually the remnants of those spaces. It was in our 2018 paper where we proved that the old observations are related to these new *in vivo* observations.

This is something I love about science – the continuity of old findings with older technology evolving to new understandings due to new technology.

Our research group has come into this conversation to say that within dense collagen layers of the body, it turns out there are these fluid-filled spaces. And when you're doing *in vivo* microscopy, you can see them live. But when we take that same tissue out of the body, the sample is going to dehydrate, and we make sections to view under the microscope, but those fluid-filled spaces collapse and disappear from our view.

There were two forms of interstitium that had been described previously. One was comprised of interstitial spaces between cells. Most cells have tight junctions between them, but when they don't, they have little spaces, and that has

been traditionally called an interstitium. The cells of the skin, the esophagus, the vaginal lining, and the oral cavity, have an interstitial fluid between them that is rich with hyaluronic acid and has tiny little collagen fragments in it.

The second and most important interstitial space, historically, is what's been called the perivascular interstitium. I prefer to be specific and say the pericapillary interstitium. That's the interstitium around capillaries and to some extent, smaller blood vessels where nutrients are coming into the tissue, through the blood, and waste products from the cells are going through that interstitial space back into the blood to be carried out either by the lungs [carbon dioxide exhaled], the liver, or the kidneys for excretion. That's the tissue that has been the primary focus of interstitial research. There aren't a lot of people who've been studying it, but

there's a solid body of work out there that's important.

LF: Are all those kinds of interstitial spaces connected to the interstitium you characterized in your 2018 paper?

NT: We have been assuming they must be, and more recent publications confirm that (Stecco et al. 2025). We first saw the fluid-filled interstitium spaces in the bile duct. As a pathologist, I see tissues from all over the body. I was receiving clinical specimens, like a colon resection or a stomach resection for inflammatory disease or for cancer. I saw those interstitial spaces in these varied body locations and I realized, it's not just the bile duct, the fluid tubes are throughout the whole digestive tract. I got a breast specimen that always has a piece of skin attached, and when I looked at that skin section on the dehydrated slide, I saw the same cracks in the dense collagen of the dermis.

That led me to reach out to my gastrointestinal colleagues with the endoscope. I asked, "What happens if you put the scope on the skin? Does it show the same fluid-filled spaces that we're seeing in the gastrointestinal tract?"

This part was left out of the Radiolab interview, but it's one of my favorite parts. They replied, "We don't put it on the skin; it's an endoscope; it only goes inside." And I said, "Well, couldn't we put it on the skin?" That's when they took me up to their lab and we injected fluorescein [a dye that shows cellular structure] into my own vein and we put the endoscope on my skin. We could see the same fluid-filled spaces in the dermis. And that was the moment when we realized the interstitium was throughout the whole body. In the 2018 paper, if you look at the skin images, that's actually my skin.

NF: Wow, that's commitment to the work.

Interstitialium as Organ?

LF: Is the novel interstitium an organ?

NT: In preparation for the press release accompanying the original 2018 publication, a journalist asked me something to the effect of, "Isn't that tissue the size of an organ?" And I said, "Well, maybe it could be considered an organ." Because there's no single, standard definition for what makes an organ. One definition is that an organ is a piece of the body that differs from others, but wherever you look at it, inside

it, it has the same structures repeating. Lung tissue doesn't look like anything else, but anywhere you look in the lung, it looks like lung tissue. The liver doesn't look like anything else, but anywhere you look in the liver, it looks like liver tissue. By that definition, when we went looking, the interstitium was found in the dermis, the submucosae, and other fibroconnective tissues throughout the body, and anywhere you looked at it, it looked similar (though we now know with interesting variations).

Ultimately, perhaps because we published when there happened to be no other major science news that week, the paper went viral. That's when people of the Fascia Research Society took notice, as well as the whole world of people interested in fascia – fascia scientists, osteopaths, Rolfers, etc.

A friend of mine, my yoga teacher, was also a Rolfer – Debby Green in New York City. She gave me a Rolting Ten Series long before my interstitium work. She would say, "I can feel the fluid in your fascia." I remember telling her, "There's no fluid there." "But I can feel it," she would say. I would respond, "But I can see fascia under the microscope and it's just collagen – there's no fluid there." Microscopy at the time was not able to show us this kind of detail. With the new microscope I mentioned, the pCLE, we were looking at living connective tissue. That's when we could see that the slides had been showing tissue that had dried out. Looking at the living tissue, I realized, "Oh my God, there is fluid there! Debby was right!"

LF: Wow! There we go, a Rolfer is a part of the interstitium story, that is awesome.

NT: Yes. In fact, I put musculoskeletal fascia in the paper for her. In one of the paper's supplemental figures, we show the microscopy of all the tissue types where the interstitium had so far been recognized in our work, and I included that fascia because of her.

LF: I think the readers are going to enjoy learning that.

Meeting the Fascia Researchers

LF: So, before you published the 2018 interstitium paper, you hadn't met the group of fascia researchers that are involved with the Fascia Research Congress?

NT: Right, it was after the paper went viral that the people from the fascia world got in touch with me. I don't know if they were angry, but Robert Schleip [PhD] and Carla Stecco [MD] invited me to have a conversation with them. I was told subsequently that a lot of people were listening because there was a lot of anger about our claim to have discovered something "new," and there was an expectation of an exciting showdown when we met to speak. But I had no idea of this.

We had our meeting, they talked to me, and I listened. I talked to them, and they listened. What I basically said was, "We did our best to search the literature to see if other people had been describing this, but we didn't find anything."

What I now realize from that conversation, which turned out to be very friendly, was that the knowledge of the fascia research community was not typically being published in peer reviewed, "Western," allopathic-oriented scientific publications, which had actually and historically, often been excluding people who have spoken about the body from an experiential point of view.

There were books about fascia out there, but these wouldn't be found on a standard PubMed literature search. And there were the famous videos of Dr. Jean-Claude Guimberteau³, but they also don't appear on a PubMed search, so I didn't know about them. The conversation was, to me, eye-opening and fascinating, and went well enough that they extended an invitation to me to attend the 2018 Fascia Research Congress held in Berlin, Germany, later that year. I accepted.

The day of my keynote address, they scheduled me to talk in the morning, right after Dr. Carla Stecco. She was presenting her own fascia research, in particular focusing on her recent discoveries about cells she dubbed "fasciocytes" (Stecco et al. 2018). Her lecture was a standard science talk like you have at conferences, and everyone was interested in her new findings, but when she finished, the place went nuts like we were at a rock concert. Applause, yelling, and cheering; people were even standing up. And I thought to myself, "What kind of meeting is this?" And, "Obviously, she's the Queen of Fascia, and now I have to follow *her*?"

With some trepidation, I took to the podium, but as I had already planned to do, I started by saying, "I'm sorry,

we didn't know about what you all have been doing." I told them that I felt like our research led us on this path through the woods that seemed like it hadn't been followed before, and we felt really proud of ourselves. As we followed this path further through the woods we discovered that it opened up on a meadow where all of them had been having a great picnic the entire time.

LF: That's amazing, and it shows a lot of grace on your part to have been able to say that.

NT: A little humility in science goes a long way.

LF: And it's brought these two worlds closer together. Did this moment feel like it was a conversation about being able to see both sides? Or did it feel like people had chosen a side?

NT: There was definitely side-taking. At the time, I had no idea what was going to happen. I just tried to be humble and respectful, then show them our data.

In my talk, I emphasized the fluid nature of the interstitium because that is the way we saw it; we were injecting a dye that moves through fluid spaces. For the fascia researchers, their primary interaction has been through physical interactions and also classical dissection. They were dealing with the material, the collagen of fascia, as well as other molecules. Now we know hyaluronic acid fills interstitial spaces as well.

There is a complementary relationship between these two research inquiries, and it's hard to see them both functioning at the same time. You can test the liquid one in the manner we did, and you can look at the fibrous part in tissue sections. It's hard to stain them at the same time for microscopy. I can do it, but it's not easy. And they kind of obscure each other then.

So, part of what I said was that we're looking at the same stuff, but I'm coming at it through the fluid domain, and they're mostly coming at it through the mechanical, physical domain.

I don't think he'd mind me saying this, but when my 2018 paper was published, I received a very critical email from Professor Jean-Claude Guimberteau. His primary criticism was that the interstitium was "nothing new." I wish I had saved the email, it was long and I could tell he was French even though the email had been written in English. I thought, "Who is this guy?" I didn't know his work at the time,

but he let me know he had a lot of opinions about my publication. He sent me links to his stuff and that's when I learned he's a classically trained allopathic surgeon and that he had documented the fascia and published several films on the subject, as I already mentioned.

When I gave my talk to the fascia researchers, I knew he was in the audience, and he terrified me more than anyone else.

LF: Oh, sure.

NT: Yes. And so, I gave my talk, and I got a huge rockstar ovation as well! This was nice. And I thought, "Okay, I survived that." Then we had the best part, some time for the audience to ask me questions, which always leads me to stuff I haven't thought of before. I was starting to relax and I was being asked good questions; it was a good conversation with the audience. And just when they start to announce that it's time for lunch, Jean-Claude gets up and asks for a microphone.

I'm thinking, "Oh no! Here it comes!" As he took the microphone, the room got so quiet. Then, he said something along the lines of, "Never did I expect to hear in my lifetime a pathologist speak about complexity, fluid, and fractals." What he said was incredibly warm and welcoming. And he invited me to the screening of his new movie that he was to present at that conference.

LF: That's wonderful. I always wondered how you and the fascia researchers came to know each other. Very cool to hear it directly from you. What an experience at a conference; 2018 was kind of a rollercoaster year with publishing that paper.

NT: [We are] looking at the same stuff, but I'm coming at it through the fluid domain, and [fascia researchers are] mostly coming at it through the mechanical, physical domain."

Bringing Interstitium, Fascia, and Health Groups Together

NT: Right. So, that was my experience. And then a few months later, I was in China doing collaborative work with Beijing Friendship Hospital regarding my primary medical specialty, liver pathology. They asked me to do a talk on the interstitium. One of the people in the audience was a liver doctor I knew, but I didn't know that he was also very high up in the Traditional Chinese Medicine world.

His first question was, "How have people responded to your research about the interstitium?" And I said, recounting my recent experience from the Fascia Research Congress by saying, "Well, there are communities of researchers, clinicians, and practitioners who said they knew about it for seventy years."

He laughed and said, "Yes, and we've known it for 4,000 years."

That was the beginning of this experience where someone from another culture said to me, "This thing you're describing, that's what we've been talking about. We've been using our own metaphors, our own language, and often describing what we feel through touch or from energetic perceptions that are not microscopic or anatomic. We came up with these ways of describing it. That thing you're describing, that's what we're talking about too."

Then, I found myself talking with a Tibetan practitioner, and we were talking about pulse diagnosis. I knew they weren't talking just about arterial pulses, but I didn't really understand what they were feeling. Then I thought, "Are they talking about the fluid pulses in the interstitium?" He said, "Of course we are." People doing

Ayurvedic practice, shamanic healing, different forms of energy healing, and others, they say, “Yes, that’s what we’ve been talking about.”

This is one of the things that excites me. I’d like to get practitioners from many different cultures gathered in an intimate meeting, like a dozen or so people. Where there’s enough diversity in the room to get creative, but not so many people that you have someone lecturing to an audience. We would start with a day without formal talking but with an array of treatment rooms and rotate through so everyone in the group gets to experience three or four of the other people’s practices. No talking, just the experience of the practices.

Only on the second day would we begin to discuss. My team and I would present all we know about the interstitium and the fascia. Then we’d invite each person to take their turn to get up and say, “This is how we relate to that information.” It seems to me that the way the physical interstitium acts as a communication network between different regions of the body, the interstitium metaphorically acts as a communication network across cultures. I’d like to see such intercultural dialogues blossom.

LF: That’s a beautiful idea. Why do you think you’re so open to these different perspectives?

NT: I’m open to it because over my lifetime, it’s how I’ve come to understand things. So I don’t have to make a decision to include something or not. A favorite

quote of mine from Suzuki Roshi (1904–1971), who founded the San Francisco Zen Center, “In the mind of the beginner, there are many possibilities. In the mind of the expert, there are few.” It’s something I live by.

A very significant influence on me has been my Zen practice. There was one Zen practice in which you focus one’s meditation on a ‘koan’. Koans are little stories or sentences that you use as an object of meditation. The most famous one is probably, ‘*What’s the sound of one hand clapping?*’ The answer isn’t moving a hand in the air. Most koans are dialogues between a student and a Zen teacher in which the student has some sort of awakening experience, some sort of sudden *aha* moment.

Koans are often about seeing things on the one hand from the perspective ‘of the Relative’ – meaning you are you, I’m me – and the world is made up of separate objects that are in relationship to each other; on the other hand, one can turn it to look at it from the point of view of the ‘Absolute’, where all reality is one seamless continuum without separation. This is the view from the quantum scale; the whole universe is a single entity *within* which differentiation happens. No separation, everything intimate with everything else – non-local, entangled, in quantum physics terms.

Which is the right view? Neither is the single right view; both are inarguably true.

I use this famous image in my complexity theory talks, the one where there are two silhouette faces in profile, looking at each other. The space between them looks like a vase. Is it two faces, or is it the vase? If you say it’s the vase, you’re missing the faces. If you say it’s the faces, you’re missing the vase. But you can only see one at a time, or the other. People will say, “Well, I can see both.” But actually, fMRI studies have shown that those who say that, their brain is just moving very quickly between face and vase conceptualizations.

LF: So, we’re naturally wired to see one thing at a time.

NT: Seems to be. I try to remember to always look at it this way, then look at it that way. That’s how I think about everything I do in my life, including my science practice. When you see something this one way, stop a moment, and say to yourself, “What if I looked at this another way?” That’s probably the

most fundamental teaching I’ve received from my Zen teachers, and it’s affected me deeply.

Suzuki Roshi talked about the mind of the beginner; when you’ve never encountered something before, you are so attentive, open to surprise, curiosity, and discernment. When I see people walking down the street in New York as a visitor for the first time, tourists notice everything. But having been a resident of New York, because I am home, I no longer notice the Empire State Building unless there’s another person on the street and a tourist says, “Look, it’s the Empire State Building!”

LF: Absolutely. I live in New Orleans, Louisiana, also a major tourist destination. As a child, I lived in Mississippi, which is just forty-five minutes away but a very different place. I can still remember the smell of my grandmother’s hardwood floors when we would come to visit her in New Orleans. Even though I live here now and experience these older homes every day, it’s as if the memory of the sensations from my first experiences are stronger than the sensations I experience today.

Beginner’s Mind

LF: You’re saying, then, that you try to keep a beginner’s mind even when you’re looking through a microscope at your thousandth liver dissection?

NT: When I look at a liver slide from a liver biopsy, I have an open mind, seeing this tissue in front of me for the first time. This is the custom of a liver pathologist, to not know the clinical history of the person the tissue is from. Liver tissue can only change and react to injury, disease, or infection in a very limited number of ways. So, a lot of different diseases will look the same. And if you tell me what the patient is suffering from, or you think the disease is something specific, I may then look at the slide and agree, “Yes, it’s that.” But, I may miss something subtle that indicates, “No, no, no, it’s actually this.”

When you are entering a room with a client, or for me a patient, I’m sure what you aim to do is to get to know the person. Even if you have worked with the person many times, maybe you’re on session eight of the Ten Series, you know they’re not the person they were. You are not the person you were the last time you encountered each other.



Image by Martin Janecek with iStockphoto.com.

NT: To be fresh in the moment, be aware of the Absolute as your body enters their space, your bioelectromagnetic field enters theirs. This is also where your microbiome combines with theirs, your physical touch meets their physical being, and all of those things start to interact. If you are attentive in the moment, that's where the healing happens.

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If you come in thinking, "I know who this person is, and I know what they need," even before you get in there, then you're more likely to miss the healing moment.

LF: This is one of the reasons why I like being a Rolfer; the work bridges the world of science and experiential understanding, including what we can't easily explain, the unknown. The training is to step closer and then step back; we're continually having to do that shift in perspective to manifest the healing moment you're talking about.

NT: Allopathic medicine, having wedded itself to reductionist techniques, often has lost that. It is common for patients to encounter allopathically trained clinicians who don't have that ability. Obviously, some of them do, but it's by instinct. Our training isn't to cultivate that. When I look at manual medicine, osteopathy, and traditional medicine, they cultivate that.

There's been pressure for osteopathic training to align itself more with allopathic training, and so you can have osteopaths who are blind to the tradition that they haven't awakened to what their full potential as an osteopath is. There's economic pressure, there's cultural pressure. Inherent in these manual medicine practices, the theory of this world – of osteopathy, of Rolfing [Structural Integration], of craniosacral work, of dancing, of poetry, of good science – is to always have that flexibility of perspective. The joy of that is that it also allows you to have the experience of awe. Who doesn't want that? It scares a lot of people actually.

LF: Yes, it is scary. It's a big leap to learn how to do this.

2025 Paper Defining Human Fascial System

LF: Before we say goodbye, can we talk about your collaborative 2025 paper (Stecco et al. 2025), "Towards a comprehensive definition of the human fascial system" that you co-authored with Carla Stecco, Rebecca Pratt, (PhD), Laurice D. Nemetz, (MA), Robert Schleip, and Antonio Stecco, (MD, PhD).

NT: When we stain the hyaluronic acid in the tissue sections with a brown dye, what we see throughout every tissue are these tiny little streams of brown that go into these larger streams of brown that become these vast rivers of brown; from between cells, to around the capillaries, and into the largest spaces within the connective tissue, the fascia, which we're now call the fascial interstitium (Stecco et al. 2025).

Now that we see the interwoven anatomies of the largest scale interstitium with that of the fascia, we recognize them to be two components of one vast, body-wide structure. However, a difficulty, as we've always discussed, is the gap between traditional anatomy based on dissection and the allopathic traditions for which such an anatomy is foundational, and other systems, particularly experiential ones, based for example on manual therapist, that rely on other concepts for understanding the body.

In this 2025 manuscript, we are trying to summarize the traditional anatomical view of the fascia and its interstitium – not to compete with or replace other views from traditions of manual work, but to find linguistic and conceptual bridges that can bring the different traditions into dialogue.

The interstitium connects everywhere. Also, once you see it, you can't unsee it. These spaces are a body-wide network. No one's arguing with that anymore. Yet, in fact, I'm having a hard time getting papers published, they get rejected often because, "Well, we already knew this, didn't we?" The answer is, "No, you didn't and you still don't."

Think: Organ System

NT: In this new paper, we are saying that the fascia and its interstitium aren't merely an organ but a distributed organ *system*. Some organ systems are localized, like the hepatobiliary system. You can define it well within a boundary. But then we have the cardiovascular system, which is dispersed through the body, and the central and peripheral nervous systems, which are dispersed through the body. There is certainly precedent in classical anatomy for a dispersed system.

On the other hand, the interstitium as a whole is not entirely contained within the fascia. That part of it is the fascial interstitium; as the largest scale interstitium, it is predominantly what I think

osteopaths, Rolfers, and craniosacral workers are experiencing through their senses – energetic and physical – when they do their manual work with clients.

However, there is interstitium beyond the fascia that is continuous with the pericapillary interstitium and the intracellular interstitium. The interstitial spaces of the body that are filled with hyaluronic acid *interpenetrates* with the fascia. And this anatomic interpenetration is the newly named fascial interstitium. The fascia and the interstitium it contains are a single system that is distributed throughout the body.

Now, why is that a problem for anybody? Part of the reason is because fascia has been on the outside of allopathic medicine for so long. There are many people, practitioners, philosophers, and scientists, who have described the nature of fascia that claim that it cannot be contained within classical anatomy. They assert, rightly I think, that the fascia tells us things about bodies that go beyond the classical dissection anatomy. But that doesn't mean we should skip having a classical anatomic view of it as well.

Is the body one whole continuum? I would say yes – at the molecular level there are no tissues, organs, systems, or cells, there are simply molecules floating in water, interacting with each other so that at larger scales, they appear to be cells, tissues, organs, and systems.

Likewise, is the universe one whole continuum? It depends on your perspective, as I explore in greater depth in my book, *Notes on Complexity: A Scientific Theory of Connection, Consciousness, and Being* (2023). At the everyday scale, the universe is made of separate parts, like you and me. But at the quantum scale – where entanglement and non-locality reign – there are no boundaries, the universe from the most vast, down through communities (cities, cultures, ecosystems), to bodies (animals, plants, sponges), to tissues and cells, down to molecular and atomic, and finally quantum scale entities, conceals some aspects and reveals others.

There are many doors to understanding fascia, each opens to a fascinating world. In this new 2025 anatomy paper, we are saying that human fascia can be thought of as a system in classic anatomical terms. You can dissect it; you can define it. But we're not saying this view is better or worse, it's merely useful

for other purposes. May the other ways of understanding fascia be also beautiful and useful. There's Dr. Jean-Claude Guimberteau's images and videos we mentioned. There's Jaap Van der Wal's [MD, PhD] philosophical conceptions of the embryo. There are the people who talk about biotensegrity. All of these are appropriate doors for understanding fascia, all of them reveal things that other doors obscure.

No single view contains the whole; we need these complementary perspectives. If you want to speak to the people in the allopathic medical community, as we are trying to do with our publications, we do this in a way that finds classical anatomy really important. And what we're trying to do is to describe the interstitium in these classical anatomy terms and also not exclude all the other doors of knowledge.

LF: I like that, several doors into the fascia and the interstitium, which we are still working to define.

NT: We want to open that door into the continuous interstitium because no one has successfully done that yet. The Fascia Research Society came out with anatomic descriptions of fascia, and everyone recognized those very quickly, yet there are still a lot of holes or gaps to address.

For me, the biggest ones are they didn't include dermis or submucosae of all the visceral organs. Histologically, anatomically, functionally, and physiologically, these are identical to and continuous with all other elements of the fascia (Cenaj et al. 2021). If you exclude those, then your anatomic statement is incomplete. Those have been addressed in the 2025 fascial system paper as well.

Our ambition for this recent paper is to get fascia and the interstitium recognized in the allopathic world. If we don't have a language with which to communicate with the allopathic world, then there's no hope for bridging differences in experience and views. We're happy it's in the *Journal of Anatomy*. There has been a lot of positive reaction to it but also some pushback against such a classical anatomic approach. We're working to find that common language for all, the scientists and the practitioners, to communicate together. My coauthors and I look forward to presenting these ideas and having discussions at the upcoming 2025 Fascia Research Congress in August in New Orleans, Louisiana.

Final Thoughts

LF: What are some final thoughts on these topics for our readers?

NT: The body cannot be reduced to pieces and parts like a machine. Anytime you try to draw boundaries, you'll capture something but lose something else. What are the best boundaries to draw? There are subtleties about the traditional defining categories. There are tricky rules about the definition of cells, tissues, organs, and then systems. Some systems are diffuse, and some are localized, and so are some organs. We are required to have the system's primary function within a definition; this is the historical anatomical standard.

With fascia and the interstitium, we had two choices. We could say that its primary function is tensional loading and sheer mobility. But we could also say it's a communication network, which is a huge theme in these other fascia-related fields. While we know all that, and that's a primary interest, it is difficult to reduce it down to one sentence, one primary function. We wanted to include the smallest fascia, the interstitium bits. Then there's electromagnetic signaling, there's small molecule signaling, there's large molecule signaling, there's cellular signaling, and there's large-scale mechanical signaling. It signals across all scales; nothing else does that.

The nervous system is a body-wide communication network, but it doesn't do all that. The vascular system is body-wide, but it doesn't do all that. The fascia and interstitium do all that, but the data that details how it does this are still thin. We need more people researching these questions. Unifying the terminology is one way for those people to get attracted to fascia and to answer these questions. Maybe our definition will be changed one day, and it will be a body-wide communication network that also does tensional loading and sheer mobility.

What we have published is our best suggestion. Some people have expressed that they feel we are forcing a definition on them. No, it's an offering, and yes, please critique it. Let's modify it. We weren't throwing away the previous efforts of the Fascia Research Society; we built on them. We tried to recognize its limitations and where the successes were. Our definition will change in time as the community starts to work with it. If those changes start to happen, it means

we were successful because people took it in and started using it as a language, and then the language evolves because it's a living thing.

LF: Thank you for being so easy to talk with today. I know my colleagues are looking forward to your presentation at the Fascia Research Congress in August, as well as your future writings on all these topics. Thank you for taking the time as well. You have clarified a lot for me and opened the door for more questions.

NT: Fantastic. That's my job, helping people find ways to put all this research and philosophy together into a tidy story. Bye for now.

Endnotes

1. See <https://www.neiltheiseofficial.com> for more information.
2. A Zendō is a Japanese meditation hall.
3. French hand surgeon, Dr. Jean-Claude Guimberteau has spent decades filming the fascia of living subjects by endoscopy and educating the public about the human fascial system. He is most well-known for his film, *Strolling Under the Skin* (2005).

Neil Theise, MD, is a recently retired professor of pathology at the NYU Grossman School of Medicine. Through his scientific research, he has been a pioneer of adult stem cell plasticity and the anatomy of the human interstitium. He is also a longtime student of Zen Buddhism. Dr. Theise's studies in complexity theory have led to interdisciplinary collaborations in fields such as integrative medicine, consciousness studies, and science-religion dialogue and have been published for a general audience in his book *Notes on Complexity: A Scientific*

Theory of Connection, Consciousness, and Being (2023). He is currently working on a memoir of his mother's last years of life and her extraordinary, spontaneous experiences of other states of consciousness, and other planes of existence, to be called *Sarah in the In-Between*.

Lorraine Fauve is a Certified Rolfier and yoga instructor who lives and works in New Orleans, Louisiana. Previously, she has worked as a creative writing teacher to elementary students through the New Orleans Young Audiences Arts Program, as an artist selling her paintings in art markets such as Jackson Square and the Frenchmen St. Art Market, and as the director of a non-profit she initiated and operated for five years called the Ugandan Women's Program, which housed and assisted young women in Kampala, Uganda pursuing secondary and higher education. Currently, she's interested in researching and furthering her understanding of fascia and bodywork, while sharing what she learns with others through writing and her work as a Rolfier.

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interstitium; fascia; complexity theory; Fascia Research Congress; Zen Buddhism; probe-based confocal laser endomicroscopy (pCLE); fluid-filled spaces; body-wide communication network; integrative medicine; Traditional Chinese Medicine; manual therapy; Relative; Absolute. ■