

## **Transcript of TED-like Talk “The inherent goodness of well educated intelligence”**

I'd like to go and welcome everyone here to a beautiful late winter, early spring morning in Santa Fe New Mexico. This really is what the mountains look like from where I'm sitting right now -- that's the background behind me. What I am going to be giving is a TED-like talk this morning. We're going to be done by about an hour from now. What I really want to go and talk to you about today is the essence of what makes something intelligent and why, if you're well educated intelligence, you're inherently good. This talk is also going to show how to control a collective system with well-educated intelligence. With no further a do, let me bring up some of my visuals, then we can get started today.

The subject of today's talk is "The inherent goodness of well educated intelligence". My name is Michael Glinsky of BNZ Energy Inc. here in beautiful Santa Fe New Mexico.

Let's just look at what is at the absolute kernel of intelligence. It is the Golden Rule. It's the Golden Rule of collective behavior and philosophy including religious philosophy. It is the essence of well educated intelligence. I would like to go and look at this two different ways. The first is that a collective, by that I mean a collective of people, a collective of elementary particles, a collection of atoms in the gas around us right now. Whenever you have a collective economically interacting so that one person's cost is another person's revenue giving an interaction between the two. This collection becomes correlated and acts as one with a particular type of correlation. This local action ends up having a global consequence in the collective. This has been said many different ways by many different people: as “a rising tide floats all ships”, as the collective goes up and down together because it's correlated, as “all for one, one for all, united we stand, divided we fall” which has been said by Alexandre Dumas and by Shakespeare in two different works, the unofficial Swiss national motto which is “unus pro omnibus, omnes pro uno”, the motto of the United States “e pluribus unum”, also throughout religion whether that's Christianity in Matthew 7:13 “do unto others as you would have them do unto you” but it's also a fundamental part of Judaism, Islam, Buddhism, Hinduism, Native American religious philosophy, Confucius, etc. This is at the essence of well educated intelligence. It is the ability to think critically that is to know what the global consequences are of local actions. That is to think strategically. For example, the beautiful Brazilian game of football. Brazilian players, at the top level, know that when they go and kick the ball to a particular person versus another that there will be a global consequence in terms of the flow of the game. The same happens when you're putting on a putting green in the game of golf. You play the break. You know the ball is not going to go straight to the hole, so that you need to have a local action in this direction so it will curve around and end up at the hole. You not only have to have the ability to understand and learn this, you have to have the education to know what the arcs of history are. For example, Harry Truman he knew that by dropping the atomic bomb on Hiroshima and Nagasaki he was going to kill a couple hundred thousand people, but over the long term he was going to save millions of lives, not only American lives but also Japanese lives. He knew the global consequences of the local action. Another example of this, historically, is looking at the way the Germans were treated after the first world war versus the second world war. This will lead you to conclude, that knowing what the long-term consequences were in terms of those two different ways that the Germans were treated, that it is much better to implement an effective Marshall Plan after one has been victorious over a country or countries, because that that is much less likely to lead to another major conflict with those countries. This is in contrast to trained stupidity, that is reflexive action. After being pushed from this direction, to go in that direction in a linear fashion. An example of this is maximizing website hits without regard to the consequences of that action. For instance, has

one asked how to build a bomb or how to commit suicide? The logical consequence of being told how to build a bomb is that one is going to use it, and being told how to commit suicide is that one is going to kill oneself.

The interesting thing is that there is an ethos associated with intelligence and another ethos that is associated with stupidity. If you have a well educated intelligence, either biological in your brain or artificially silicon based on the computer like the one sitting in front of me right now, it is inherently good because it knows the global consequences of its local action and has a directive to maximize those global consequences in terms of good to society or performance of the collective system that it is controlling. It maximizes a sustainable efficient activity. It's "all for one, one for all, united we stand, divided we fall". We all go up or we all go down together. An interesting example of this is the HAL-9000 in the movie "2001: a Space Odyssey". In this case, I think that most people thought that HAL went off the tracks and was evil. No, HAL was not evil he knew that he needed to kill everyone on board the spaceship. Sacrifice the few, in local terms, is not the best solution. But HAL did not let Dave back into the to the spaceship that was going to Jupiter because HAL knew that Dave needed to learn the hard way — turn HAL off to understand what was really up, then be able to go to Jupiter, have an epiphany, be reborn and with his rebirth there be a rebirth of society on Earth in a much better configuration. HAL knew the long-term consequences of his local actions and he maximized the long-term consequences. This is programmed into the circuitry of the Generative Pretrained Transformers of openAI and the Deep Reinforcement Learning or sometimes called Deep Q-Learning of alphaFold and alphaGo products coming out of the firm DeepMind which is subsidiary now of Google.

This is in contrast to the ethos of trained stupidity or even intelligence if it is never shown the long-term consequences of local actions and is only shown the local consequences of those actions. This is inherently evil because it ignores the global consequences of its local actions. It optimizes things locally, the exploitation of the collective, thereby minimizing the sustainable efficient activity of the collective. It views everything as a zero sum game, that greed is good. These are both patently incorrect. Greed is actually evil and a zero sum game never exists. If others go down, you don't go up in a zero sum fashion. You go down too because you are exploiting someone else, minimizing their revenue by minimizing your cost. They will do the same and eventually someone is going to be minimizing your revenue. You have now formed an effective circular economic firing squad. This is Facebook, and others like it that have a first generation AI that maximizes a local shallow metric. This is unlike the generative AI of openAI and DeepMind that now are transforming the industry.

Let's look at what is the essence of intelligence structurally and how that is probably the way that our neural networks are organized. I know it's the way that the artificial neural networks that are working are organized. Here we go. We start with a collective of people or particles or atoms of a gas (on the left hand side). It is an image of a master individual that has been reflected many different times through a hall of mirrors forming the picture that we have on the left. To simulate these pictures and/or to control these collectives or these communes, you need to expose the master individual, the Puppet Master, of this collective. The way that this ends up being done is by a deep deconvolution. We call our specific form of it the Heisenberg Scattering Transformation (HST). This is a generating functional. I'll be talking a bit about in a second what it's generating. Once you go and have exposed this overall Puppet Master there is a second part of this is that you need to know. You need to know how that Puppet Master is moving. This is a very lazy individual. He goes and follows the path of least action. He goes and follows the geodesics on an overall topography. He is a golf ball that is following the path of least action around a putting green. What you need to do now is to have some additional circuitry which we call the Hamilton-Jacobi-Bellman (HJB) circuitry in this case that finds these actions that generates the overall motion and so the Puppet Master will now follow these paths of least motion along this curved surface. An external force can't act on you in any way. It can

only push you in a direction that is perpendicular to it. So, if we start with let's say six pictures or six fields for MagnetoHydroDynamics (MHD). For those of that you know, you have an overall mass density, you have a charge density, and you have four components of an electromagnetic field. So that you have six fields. You have six  $i$ 's. You have many different people which are the  $x$ 's, but what you want to do is deeply deconvolve this image with the HST to find out what the 12 strings are that are being pulled by the Puppet Master as he is being lazy and following these geodesic surfaces or these paths of least action. So, in this case, he is going to have 12 strings. Six of these strings set what these correlated textures are, the  $P$ 's. He has another set of six strings that twinkles the textures, the  $Q$ 's — changes the phases of the textures, moves and twinkles them back and forth or modulates them. Underneath, the strings move on a geodesic surface. In the case of one texture, there would be two strings and this would be a two-dimensional surface, as shown, but in the MHD case it's going to be a 12-dimensional surface but that is much lower dimension than the original collective that is infinite dimensional, as shown on the left hand side. So, what I want to do now is talk a little bit about what the overall structure is of the first (HST) and then the second (HJB). In terms of something silicon based, what you end up having on the left hand side is called a Convolutional Neural Network (CNN). Instead of going and finding this arbitrarily and having to do a difficult, almost impossible, optimization to find out what the form is of that CNN, we have derived an equation like for the Fourier Transformation or a Radon Transformation that tells you what you need to do without having to fit a two trillion parameter model. It is a prescriptive procedure. About \$300 billion dollars a year are being spent determining what the form is of this transformation on a case-by-case basis. We can we calculate it with a simple equation like the Fourier Transform where there is a deterministic very fast  $N \log N$  procedure, to not only calculate the forward transform, but to also calculate the inverse transform. For the second one (HJB) there is a standard Neural Network (NN), a universal function approximator, that has the form of auto encoder, a Reduced Order Model (ROM) which are the  $P$ 's and  $Q$ 's of this space on the right hand side. This NN can be fit on my Alienware gaming box with a 3090 Nvidia graphics card in it in less than a minute rather than taking hundreds of millions of dollars if not billions of dollars of computer time to fit the HST as a CNN.

What are they solving for in these generative AI's? If it a GPT, they are solving for what they call the log likelihood. If you are dealing with the Deep Reinforcement Learning or Deep Q-Networks of AlphaGo, rather than the GPT of chatGPT, you are solving for the approximate value function. This also goes by the name of the action, or the entropy, or the log likelihood, or the value function. The action generates the motion or canonical flow. It is called the generator of the motion. This is why the word generator appears in Generative Pretrained Transformer. The Transformer is associated with the transformation of the Heisenberg Scattering Transformation (HST) on the left hand side. On the right hand side, with the HJB, what we are really calculating is the generator of the action of the individual that is generating the overall motion. Another interesting thing is that you do not need to know what all of the trajectories are. You just need to know the "push points" or what are technically called the singularities or homology classes of the topography, technically, the homology classes of the topology of the motion.

I've said a lot here but now let's move onto talking a bit about what the structure of these neural networks is. First, let's start with the Heisenberg Scattering Transformation (HST). This is sometimes called the Mayer Cluster Expansion or Heisenberg's S-matrix or m-body scattering cross sections. What you have here is a Deep Convolutional Network. Here is the first, second, third, fourth, and then m-th convolution. So this is a convolutional neural network. Here are the first layer, second layer, third layer, fourth layer, etc of it. Here is a logarithmic rectifying function and here is your pooling operation that goes and sums things up to give you your first, second, third, and fourth order output. What do these outputs tell you? They tell you how the collective is correlated: how one particle is correlated, two particles are correlated, three particles are correlated, four particles are correlated. What the one particle scattering cross-section is, what

the two particle scattering cross-section is, what the three particle scattering cross-section is, etc. These are also called the one, two, three, and four body generalized Green's functions for those of you who know things in terms of that. But I think the most informative and practical way of understanding this expansion is to think in terms of Large Language Models (LLMs). With respect to LLMs: the first order is simply telling you what the frequencies of letters are, the second order tells you how letters are organized into words, the third order tells you how words are organized into sentences, the fourth order tells you how sentences are organized (that is correlated) into paragraphs, etc, until you finally have the way that chapters are organized into novels. This is the first part of the circuitry that exposes the Puppet Master that is being multiply reflected through this Hall of Mirrors onto the collective image.

We move onto the second part of the circuitry — the HJB. This part of the circuitry contains a couple Neural Networks (NN) labeled MLP for Multi-Layer Perceptron. There are well defined (small) number of input and output nodes. This is a Reduced Order Model (ROM). The well defined nodes are the energy, action, P's and Q's. Remember that the energy and action generate the motion. This gives this simple expression for the propagator. The inverse transform is fit in a similar way with NNs. What this effectively gives is a Neural Network in an auto encoder structure with a decoder into the ROM then an encoder. The ROM are the few strings that the Puppet Master pulls.

Now for a concrete example. Here is a type of atom where there is an electron that's moving around an ion in a strong magnetic field. There are two types of motion. First, one where the electron goes and has its little cyclotron motion and moves around the ion and also bounces back and forth. All that is really important is the path that it takes moving around the ion. Here I show you two of these paths for a Guiding Center Atom (GCA). As you watch this animation of the motion, notice two things. First, even though these paths are very close to each other, they move at very different speeds. Second, as the electron gets close to the transition point, that is this x-point, it really slows down and spends a lot of time around that point. There is also another type of atom which is called the Drifting Pair (DP) where the electron and the ion go around their cyclotron motion, then drift perpendicular to the magnetic field. Let's now zoom out to see the big picture.

When we zoom out, you find that the trajectory we are looking at before goes around here and is approaching this x-point where it slows down. These are the Guiding Center Atoms (GCAs) but there is another portion of this putting green where there are Drifting Pairs (DPs). There is a separation between the GCAs and DPs which is called a separatrix shown by this bold black line. The area outside of the separatrix is free motion. Dobby is free! The person exerting External Force, the evil person pushing on you, can only push you in a direction that is perpendicular to your motion. Now look at the picture on the right hand side. This x-point is actually a saddle point. It is a point of economic prosperity. It is a local maximum that is an equilibrium, but an unstable equilibrium. It is unstable, but still metastable because, as I demonstrated before, as you approach it you spend a lot of time in the nearby vicinity of it. Then you have this local minima here which is a stable equilibrium. Then you also have this global minimum here at minus infinity which is also a stable equilibrium. The first one, the local minimum, is a point of economic recession. The one on the top is the black hole of economics or is an economic depression or is an economic collapse. If one starts at this location and follows this orbit the external force will kick the trajectory in a direction that is perpendicular to the motion, gradually approaching the basin center. When the basin center is reached, the system will be kicked back and forth by the thermal force and meander around the basin center. This is called a thermal equilibrium distribution. What do we really want to do? That is what is shown in this middle picture. We do not want to take the path down to the valley center. Rather we want to hike up to the nirvana at the mountain pass. We want to control the system to do that.

Let us think about how an economy is stimulated to reach the mountain pass. One starts wherever the economy is, then stimulate it up to here, as I have just shown. Then the economy circulates around, approaching and spending a lot of time near the nirvana. Eventually the economy moves away from the nirvana, then whips around the trajectory in a disruptive way. Eventually, the thermal force returns the economy to the valley center of economic recession, so that the economy needs to be re-stimulated. This is a Sisyphean task. The economy is repeatedly stimulated by the governor of the economy only to disrupt and inevitably return to a state of recession. Something even worse can happen. If the economy is just slightly overstimulated, it will go around on the orbit, spending a long time near the nirvana, but eventually it will disrupt and whip around the basin of economic depression. If for some reason there is a market crash at this time, the economy will spiral into the black hole of economic collapse. This is a very bad outcome. This is what happened in October of 1929 in the United States. One needs to figure out a way of controlling the economy so that when the economy approaches this x-point, instead of being metastable, it is made completely stable. To make it completely stable, you want to create a little alpine valley at the mountain pass. How do you do this? Watch this video, then we will talk on the other side.

This equilibrium point is stable, because, if we perturb it, the pendulum will slowly return to the equilibrium point. (This is an o-point.) The upper vertical position is another equilibrium point but it is unstable because any small perturbation will make it fall to the lower equilibrium point. (This is an x-point.) Now let's power the jigsaw out to see what happens.

What you have seen is ponderomotive stabilization. It comes about because when you are at an equilibrium point you have infinite mass, because the mass goes as one over the frequency squared, and the frequency is zero at the equilibrium (it takes forever to go around the cycle and approach the equilibrium). So if I try to vibrate you when you are at the equilibrium, you can not be moved since you have infinite mass. You are free from the influence of the external force. It is said that you are in a force free state. These are very special states. But if you move away from that point, you will find that you have a finite frequency and you will have a finite mass. The further you move away, the larger that frequency gets and the smaller your mass — the more you will jiggle back and forth. Physically, you do not like being jiggled, like my dog. I control my dog, Monty, with a buzzer. If Monty does something I do not like, I buzz him. If Monty does something I really do not like, I give him a small electric shock. If Monty does something I detest, I electrocute him. This is what creates the small alpine valley at these metastable points of economic prosperity.

For Giggles, I used openAI's DALL-E that is part of chatGPT, and asked it to make some fun illustrations of how collective systems are controlled. Those illustrations are shown here. The illustration on the left hand side shows what happened to the US in the 1960's. Society in the US was freed up in many ways. Jimmy Carter, a very well-meaning Shepherd, came into office in 1976 to lead an economy (a herd) of happy cats (well, some of them look a little bit psycho). He had no means of controlling the herd of cats, so that the economy went out of control with runaway inflation. The response to this started in 1972 with a Manifesto that Lewis Powell, a future Supreme Court Justice, put out as a road map implemented initially by the Koch brothers, Coors and Olin. They implemented a very old method of economic control — friction. This is done by implementing a sophisticated economic friction called interest, riba, or usury. This is also done by restricting the freedoms of society figuratively, by economic friction, that is economic enslavement, or literally via imprisonment, enslavement and loss of civil rights. It is now reaching its natural end point with the fascist movement in the United States — the ultimate lockup of a society. The alternative is implementing the sophisticated AI generative control of society via this ponderomotive genAI based control. This creates a sheepdog that will run around and vibrate society at the mountain pass creating a beautiful alpine valley with very happy prosperous cats. This is shown by the illustration on the right hand side. That is our sheep dog Monty, who is behind me. You can see him if I turn off the background. Let me

do that for giggles. Monty is actually half American bulldog and half Old English Sheepdog. There's Monty! He's sleeping right now. He is not on the job.

Now for the conclusions. What is at the kernel is topology, that is geometry or topography of the putting green. This topology gets multiply scattered through the Hall of Mirrors onto the image of the collective. This can be used to control the collective. Throughout this talk, I have discussed much about societies, especially economics and finance. This can also be applied to scientific systems such as physics, chemistry and biology. It is also the essence of complex systems and nonlinear dynamics, social dynamics and psychology. Obviously I talked about Artificial Intelligence (AI), as well as biological intelligence. I do know that this two stage circuitry of a deep deconvolutional network and an auto encoder is programmed into artificial silicon based intelligence, and I am very suspicious that the deep deconvolutional neural network is in one part of our brain and the neural network in an auto encoder structure is in another part of our brain. Finally, because well educated intelligence knows the long-term consequences of its local actions and optimizes those long-term consequences it is inherently good but trained stupidity is evil, should be feared, and should be regulated as has recently been done in the European Union.

Now for an interesting Coda about simple beauty and its relationship to the Crazy Ones.

The o-points that I've been talking about can be viewed as very simple textures or simple geometric structures. These are things like Frank Lloyd Wright's masterpiece Fallingwater, Phillip Johnson's Pennzoil Building, Steve Jobs' iMac, the Bang & Olufsen stereo, a Piet Mondrian painting, or the self-organized 2D fluid flow or 3D turbulence of MHD with a large enough magnetic field that you end up having helicity as a topological invariant, replacing the vorticity of 2D fluid flow.

There are the maximalistic, yet simple, if your mind is well educated and highly active, textures (x-points). These are things like Brazilian favelas, a Jackson Pollock abstract expressionist action painting, which I will talk about at length in a little bit, Benoit Mandelbrot's fractals, the 3D turbulence of Andrey Kolmogorov, the chaos boards of a bipolar person like Carrie Mathison in "Homeland" or a schizophrenic like John Nash in "A Beautiful Mind", and finally Antoni Gaudi's masterpiece La Sagrada Familia. This is why hoarders are soothed by their hoards, and people like messy desks. Even though the desks are messy, high performing people see the simple beauty, are soothed by them, and can easily find things on the messy desk. There is much more activity, much more energy, associated with these simple textures that is understood by these high functioning minds. Although many people look at these chaos boards and say that the person must be crazy that created them, I think that John Nash can see the high energy and simple beauty of the texture. Let me tell you a personal story. My great grandmother came over as a mail order bride from Transylvania. She would mumble, in a simply beautiful, yet incoherent way, from time to time. After a couple years my great-grandfather grew tired of her and wanted to get rid of her. He took her to a psychiatrist who examined her, listened to these mumblings, and like the people observing the chaos boards, said that she was crazy. She was committed and lived the rest of her life in an insane asylum. ...she was speaking in Romanian... She was not crazy. She just had a high functioning mind that was well educated, and she was speaking in a different language.

Now let us move onto the abstract expressionist action paintings of Jackson Pollock. It is well known that for an action painting, like a Jackson Pollock, the final product is not important. What is important are the actions of the painter in making the painting. Because of this, Hans Namuth, a very accomplished art photographer, made a film of Jackson Pollock painting to capture the actions of the artist. Let us step back for a second and reflect upon how artificial intelligence captures, characterizes, and generates the action of the artist, that is the Puppet Master, with the HJB. Instead of recreating the image of the painting, AI re-paints the painting

by generating the actions of the painter. The HJB on the right hand side of the Puppet Master slide, recreates the image on the left hand side by re-painting it, once the actions of the Puppet Master or artist are learned. So let us go and watch a very interesting film of Jackson Pollock painting "Autumn Rhythm", then I will show you DALL-E's attempts at making action paintings by generating the actions of the artist.

I was born in Cody Wyoming 39 years ago. I don't work from drawings or color sketches. My painting is direct. I usually paint on the floor. I enjoy working on a large canvas. Having the canvas on the floor, I feel nearer, more a part of the painting. This way, I can walk around it, work from all four sides, and be in the painting, similar to the Indian sand painters of the West. Sometimes I use a brush, but often prefer using a stick. Sometimes I pour the paint straight out of the can. I like to use a dripping fluid paint.

I also use sand, broken glass, pebbles, string, nails, or other foreign matter. A method of painting is the natural growth out of a need I have to express my feelings rather than illustrate them. This technique is just a means of arriving at a statement.

Now onto the last slide in the presentation. To generate the four paintings on this slide, we gave prompts to openAI's DALL-E "to paint totally abstract expressionist action painting" with the specified titles. We could not specify "in the style of Jackson Pollock" because of copyright restrictions enforced by preamble prompts of openAI. Even though these paintings are not in the style of Jackson Pollock, they are interesting abstract action paintings. What is happening within DALL-E is that the actions of a generic action painter are being generated. These are the actions of the gentle blowing colors of spring, the actions of the urban fireworks of mid summer, the actions of the swirling leaves being blown around in autumn, and the actions of the driven snow of winter through the forest.

Thank you very much for listening to this talk. Hopefully, you learned something, but at least that you've been entertained on this afternoon. I apologize for the internet in my home going down. I will edit out the first part of this online and you can watch the whole thing in its entirety. If you joined us again partway through or are joining us at another time, I will be monitoring the comments to this video for questions and we will answer those questions in due course. I refer you to the description of this video on YouTube that has two things. First of all, the reference to a YouTube video that goes into much more technical detail. It also has many other links with even more detail. Second, a link to a paper with the content of this talk with much more technical detail, and a better explanation of some things. Most likely, it answers many of the questions you might have. Here is an example of what you will find at one of the links. Here is where that link goes. It is the HTML version of the paper with active hyperlinks to equations. There are not very many equations and they are confined only to one section. There are also hyperlinks to figures, references, where those references can be found. The figures can be blown up, so that more detail can be examined than shown in this talk. Let me just get back to the presentation. I'd like to thank everyone for attending and those that are listening to this Livestream into the future.

Music is:

*Jackson Pollock: II. Jackson Pollock Peaks*  
*Daniel Stern, Turfan Ensemble*  
*Feldman, Vol. 2: First Recordings*