Andrew: Hi, Linda! Welcome back to the show. It's great to have you here again.

Linda: Thank you, Andrew. Thank you for having me on again.

Andrew: Now this episode, we're going to do something really special because this episode we're actually dedicating to the work of Nelson Freeburg. Nelson was a very well respected person in the institutional community, but perhaps to the retail trader, his name may not be so well known. I think we can all learn something from his work and his process, so I'm really excited to be presenting this with you today, Linda. Now I know you and Nelson were very close friends for a long time, so can you tell us a little bit about Nelson, some of his background and how you came to meet?

Linda: Yeah, Nelson and I had a friendship for about 24 years and we shared a love of the markets, modelling, people in the industry, fine food, American music and composers. We spoke together numerous times two decades ago, in many parts of the United States as well as overseas, and we were both members of the MTA, APTA, IFTA, which is the International Federation of Technical Analysts. This is a friendship that developed over years, but from the very beginning, he come to me on his formula research newsletter and I'll describe the background of that. In exchange, I comped him on my little chat room forum that I had. We were sort of opposite ends of the spectrum in terms of he believed in his longer-term timing models and here I was doing much more short-term discretionary. We had many, many wonderful exchanges over the years both theoretical, philosophical, and shared each other's work.

Just to give you a little bit of background about Nelson – and by the way, I need to preface this how this did come about. I contacted you because Nelson passed suddenly a year ago. He did such fine work and was such a fine gentleman in the industry but he never wrote a book. He never had a website that documented things, and all I have is this big pile of formula research letters from the years. He was one of the very first early quants in my opinion that subscribed to the thesis that the methods are deficient if they rely on subjective judgment. And so I wanted to do a presentation in his honour of some of the things he contributed to the field of modelling and his philosophies, so that's another way that this came about.

Now I'll jump and give a little bit of background on Nelson because you wonder how did a person that was going for his Ph.D. in world politics end up in being a researcher for the markets. Originally, when he was developing his quantitative models as a graduate student, he was doing quantitative models on thermonuclear war. Okay now this is many, many years ago, so he did have an exceptional math background even though you wouldn't know it because his vocabulary consisted of many four-letter words. Mine, of course, are all one-syllable words, okay; his were four-syllable words. He started start off by building his own database, which was a big deal back in 1990. There wasn't access to the data

that we have nowadays or the ease of data. And so with his financial database, which went all the way back to the last century, he had an exceptionally powerful tool and from this, he built a library of advanced training strategies as well as over time, he would take other people's work and try to find ways to improve on it. And so that's some of the things that I wanted to discuss as well.

He was just the finest individual in that he was exceptionally humble and always giving credit to everybody else. He would tout the work of Perry Kaufman, Martin Zweig, Ned Davis, Tom McClellan, John Hussman, Paul Merriman, Mark Boucher. Paul Tudor Jones was a huge fan of Nelson. Actually, the two of them went to school in Tennessee in their early years. His graciousness in this industry and to never taking credit for anything always struck me and set a really fine example. You would never hear him toot his own horn.

That's a good introduction. How is that, huh?

Andrew: That's really good. You mentioned that he published a newsletter called Formula Research. What type of people actually read or consume the information that he was publishing?

Linda: Well, it's kind of interesting. I know that Martin Zweig, Gerald Appel and Tudor Jones were some of his first clients, so a little bit more institutionalized based. But I also know he had clients in 27 countries, so it spread to be a pretty broad-based newsletter or research letter if you will. It was reviewed in *Stocks & Commodities* magazine, so obviously, your small niche trader had access to it. I think he'll only charged $195 for a one-year subscription, which was a huge bargain, considering that you still had to pay for postage back in those days and printing costs, so it was widely accessible.

I would say that the last 8 years of Nelson's life and the frequency of his publishing the research letter dropped off dramatically, but his early work was extremely solid and I think he took to timing models from so many people. Very interesting – timing models for a stock market timing, gold timing, bond funds, a lot of switching models, seasonal work. He was one of the first to really, really exploit seasonal work in a lot of what he did, even the holiday stuff. Nowadays everybody looks at these types of things but Nelson was one of the first in my opinion.

Andrew: Okay, so before we talk about the building of these models a little bit more, you mentioned a couple of examples high level there, so what kind of components did he actually look at when building these models?

Linda: Well again what struck me most was that he would take other people's timing models and they could use sentiment variables, market breadth variables, monetary variables, so many different types of data, that's something called the PMI. I'll give you some resources that you can Google and see some of his research letters. But he'd take these timing models and then his whole focus was to limit risks. He would take these models and improve on them by finding ways to improve their risk-adjusted basis. He was very good at adding filters in my opinion and some of the types of filters that he would include were either the use of some monetary variable like a short-term paper, the yield on short-term paper. In particular, he would look at things like if these yields are above or below 50-period moving average, and also some type of trend filter. Now if you want, I can jump right to the meat of the matter and give you an example of a model I still look at nowadays.

Andrew: Okay.

Linda: And then that might serve as a good basis. This is actually a very simple model. It's a model that we actually have on TradeStation. Nigel, when he worked for me, programmed this on TradeStation and it's one of those things that you can easily tweak as well. Keep in mind that this particular model was developed 15 years ago at least, but it will give you an idea of the creativity that Nelson had. This model he called the Russell Growth versus Value, and it was the model for simply assessing whether it should be in the market or out of the market, pretty simple and straightforward.

The first variable was using the Russell 2000 Growth and the Russell 2000 Value. What he did is he would take a 5, 15, 25, and 35 period look back, average the four of those readings. Now once growth, the ROC, the rate of change readings of growth, closed above value for 2 bars, one crosses the other, that was condition 1 that had to be meet. It's basically a relative strength type of model, saying that when the growth is outperforming the value, you need to be long.

The other two filters are the OEX divided by the SPX must cross above its 50-period simple moving average, and the NASDAQ divided by the SPX must be above its 50-day moving average. When all three of those conditions are positive, you are long in the market. It takes all three of them to turn negative for you to go into cash. A clever little twist looking at momentum in a way by the Russell 2000 Growth versus the Russell 2000 Value, and it doesn't give many signals. That's something interesting, and a lot of these timing models, they might just give anywhere from 1 to 2 signals a year, sometimes even if that.

I will give people another way to see on the Internet if you simply Google "formula research" – which is the name of his letter – and Tom McClellan, "formula research Tom McClellan." In two of his issues, he reviewed the work of Tom McClellan, and Tom was gracious enough to include both issues on a PDF that you can download for yourself, so voila! I think there's a copy. I think one of them discusses a gold future timing model. Nelson had tested it back to 1950, and what's interesting is he made a comment that Tom would never use a simple formula like this in isolation, but the theoretical results are instructive.

It's just opening up your mind to different things that you can include or different things that money managers or more institutional people might look at. The ultimate example of this of course is Ned Davis. Ned Davis just modelled everything under the sun. He used to compile a quarterly book of like 3,000 of these models and the managers could sift through them and see what struck them most.

But again, the point is that we had some interesting discussions over time on whether you do out of sample testing, how far back you go, and the pros and the cons of both of them. Because I was doing a different type of modelling mostly priced-based work, very technical, I could get huge sample sizes whereas Nelson had this more holistic type of approach that included variables, short-term interest rates, all sorts of longer term things, sentiment readings and market breadth things. Therefore, he would end up with a much smaller sample size and so we used to discuss whether his work would hold up, whether it can be considered to be durable and robust when he had such a small sample size. But Nelson was really big on 'common sense counts a lot despite the lower sample size'.

So I think it's up for the listener to judge for themselves and one thing that they can do is look at the gold timing model that was presented in the Formula Research that was featured by Tom McClellan because interestingly enough that gold timing model was produced in 2003. Now I know the initial testing for this gold timing model went back to 1950, so here it is 2003. Then in the next 10 years, you entered the most unique incredible monetary environments where there were no previous examples of this type of global mass money printing. I just challenge the listeners to replicate that model for themselves because all the variables are disclosed right there, you replicate it for yourself and then see how it would have held up over time.

Andrew: I've also actually read that Formula Research article on the McClellan website and there is an application for the gold timing model as a short-term trading as well, so I think typically when you think about timing models, they're longer term. But I think if you look at the principles behind them and perhaps there's applications in other types of trading timeframes as well.

Linda: Absolutely, absolutely. You know all of this, by looking at the methods that other people do, how they went about their testing or their modelling, you're just always educating yourself. It's like you might be an English student but if you had to go take a history class or class on political philosophy or anything like that it's just going to increase your "well roundedness" and you might just come across one or two things that would give you pause. For example, when you did the interview with me last week, one of the questions that came up was about out-of-sample testing, if you do walk forward and so forth.

Nelson actually answered that question. He was very good about arguing all these theoretical pros and cons. He said, "On one hand, you don't want to extrapolate a trend that may no longer be there." So for example, if you had developed a model, do you want to include data from the 1930s from the 1940s to the 1950s, etc., but what if there were some interesting unique trend during that period but now is that going to influence your data currently where this price behaviour no longer exists. But on the other hand, you do need to see that the system worked in all sorts of price behaviours. Could it have survived that awful 1929-1932 period or the recent downtrend that we had?

These things were important to Nelson because his number one driving force, besides just trying to get rid of all subjectivity, was ways to minimize risk. A lot of the questions that I received last week were people asking about trend-following methods, was there a filter, a way to know when to use them, when not to use them, and so forth, and so forth, which I said, "No, there is no way. You're trying to capture an outlier." But Nelson's research on this was very, very robust but any trend-following system that's going to produce 15 percent returns overtime is going to have a 50 percent drawdown at least, at least, at least, at least.

The data, you can take any 10-year rolling period and see that it will have a positive expectation but crazy huge inherent drawdown and Nelson said it himself, you'll achieve fairly consistent profits over time but at huge costs of this irreducibly high amount of drawdown. His number one driving goal was how do we reduce that drawdown because once you can reduce that drawdown in the system and that might be reduced by having a model that switches you into cash, all right, once you can reduce that drawdown, then you can increase the leverage. Boy, oh boy! He was the master of figuring out ways to turn $10,000 into $100 million simply by reducing the drawdown and increasing the leverage.

Andrew: Okay, and so did he work on long only models?

Linda: No, he did currency models. He did bond models. He did gold models. I particularly liked his relative strength work, with the ETF switching, I think he was one of the first to do that more aggressively, but again it might have been under the guise of taking somebody else's work and improving it.

Andrew: You mentioned that he had data going back to the last century and he often did tests back to the '50s or the '30s. It must have been quite difficult getting some of that data and perhaps the accuracy of that data may come into question. What kind of lengths did he go to get all this type of information for his database?

Linda: Now that I can't answer, but I can tell you that all that Nelson did was this Formula Research letter, so with this type of research in model improvement developing, it consumed a fair degree of time. He always said he wanted to manage money, but I never saw him do it or even get partway there, and I think it was just because he was so consumed by his own research and publishing this letter.

Andrew: Okay. So in a trading or research kind of context, what do you think was Nelson's biggest strength?

Linda: I think it was a genius at creating monetary filters. It was just really interesting nowadays, see how we are, I'd be curious as to how many of these models actually holds up these last 8 years in the current monetary environment, which we've never had before and that's one of the problems with certain types of modelling. He'd look at the spread in between the discordant rate and the yield on 90-day Treasury bills, but again you know this all of a sudden, this might be a mute issue with the Fed actions that we've had.

He loved mutual funds switching models that would also include an option to go into cash or T-bills. That was a big one of his. I would say that most all of the successful models did have some type of trend-following component. Some indicator of variable needed to be its 200-day moving average or that type of variable or filter in there, and he also was big on voting systems. This is something that perhaps the type of research that people do for the real technical systems never consider, but a voting system is well you have maybe six components and if four of the six are green and the model goes long, that type of thing. That was another type of approach you could do to the modelling.

Andrew: By studying his work, what can we learn - I don't mean just the obvious stuff like how his models work - but at a deeper kind of a level. Is there some underlying philosophy, or attitude, or approach that we can learn and apply for ourselves?

Linda: Yeah, I think people –everybody likes to optimize the results. I mean it's a temptation to go there and Nelson felt very strongly than anything that was optimized was not going to hold up or make money over time. But even deeper I think people when they're creating their models, they need to take a much deeper look at some of the things that affect the risk, number of consecutive drawdown, largest losers, how long it takes for the model to get back to its high equity point, these types of things. Nelson I think was way ahead of his time in really emphasizing that, but of course people like the glory. "Oh,

just tell me how to take $10,000 to $10 million," and he could show you how to do that but it was very clever on the ways he minimized risk and he felt very strongly about that.

Again, in people's own trading they sit there and say, "Oh, gee! What was the best profits factor or the largest average win or even worse which set of parameters made the most money?" I think that's completely barking up the wrong tree, but instead you need to look at these other types of measurement to see where the Achilles heel could be in that system.

Andrew: Yeah, that's a good takeaway. So what about you personally, what was the biggest impact Nelson had on your own work?

Linda: I don't think it was necessarily the content of the letters that made an impact on me. I think it was his own enthusiasm for the way that he could extrapolate these outrageous results like I remember there's a story where he took his five all-time favourite stock market timing models, I have no idea how many he had. Then he combined his five favourite stock market timing models into a structured whole, so he had a composite model that would outperform any single component. He was the master of that.

Then what he did is he gave a private seminar for Paul Tudor Jones and some of his key traders and the Tudor group was amazed. He showed them how to turn $10,000 into $65 billion. That's true! He actually did that with his composite models and so forth. Of course, that was obviously over a period of three or four decades and the compounding, the power of the compounding and so forth and so forth that he was just so gleeful like a little kid like, "Look! I got the Holy Grail right here by combining these models and stuff."

On a modern-day take, you could say, "Let's combine if you're doing mechanical systems, and this is along the lines of what we did when we ran a portfolio with these things. We would have both for example a trend-following and a mean reverting, or a volatility breakout system that would trade as an overlay, as a money management function against a longer-term system. So for example, you might have a system that would have an average holding time of say 14 days or say 20 days. But if you have a volatility breakout system that would take the trades in the opposite direction. For example, when there was a long liquidating flash or a long short squeeze, basically what that does is it takes you out of your position, you're flat by nature of the countertrend mean reversion function. That might only have a holding period of say 1-1/2 days and then when it closes out its position, you are back in with the original longer-term position. That's on a simplified basis, but obviously you can see the room for many, many overlays along this line.

Andrew: You've already kind of touched on this a little bit by mentioning by the Google search and the links to some old Formula Research newsletters, which I'll add to the show notes page, so people can find them easily. But if people wanted to find out more of Nelson's work, is there any other ways that they can do that?

Linda: Sadly, no. That's why I just felt compelled to at least present the tip of an iceberg, just a few simple points, and hopefully that will also give motivation to anybody that's out there that does individual research or unique research. They don't have to give away the secrets to their models, but I think there is more room for theoretical debate amongst the community, the quant community where people

don't necessarily have to reveal anything proprietary but yet there is enough people out there that share their work, that it sorts of end up keeping a little documentation from a couple of years to a couple of years to a couple of years.

There's members of the quant community that have blogs. They are gracious enough just to share their take on different things and that's a resource for all your audio listeners. I don't know if you have a compilation of different quant blogs on your site. It gives little windows of insight as to the way that people go about their work without necessarily having to disclose anything proprietary, and hopefully the listeners understand that there is not just one authority out there. I have to say that many times when I was doing a lot of my initial testing with Steve Moore, I'd get some results back and I'm like, "Wow! This is fabulous. This is so consistent!" Then a week later delving into the data, I'm like, "Geez! There's a flaw here." That happened many times. These results are not quite as stellar as I thought they were. And so, I've seen others make that mistake, too. In their exuberance, they might disclose something and later on they go back and find it wasn't quite as they thought.

Then there's people out there that put out interesting models and conveniently neglect to include one or two key variables, you see. It's always a caveat emptor, but back to the fact that everybody really needs to go do their own testing and if you do find something see if you can improve upon it or find a way to make it your own, very important than research.

Andrew: Is there anybody out there that's currently doing similar type of work that Nelson has done?

Linda: You know I think it's very cool that everybody is latched on to the sentiment variables in numerous ways, shapes, and forms, all the little biases, the preholiday into the month, beginning of the new month tendencies, and people need to be aware of that. This is not anything new at this point. I think Victor Niederhoffer always used to preach that like once something is out there in the marketplace and it's been getting exploited, it can become a little bit trickier. The half-lives are shorter than ever, but some of these things still hold up. Jay Kaeppel does wonderful work and he publishes a blog and he puts out some of these funny little things along this line. Tom McClellan does interesting work with taking variables and finding the correlations if you set it 10 months forward or 10 months back, and he publishes I think once a week, he sends something out there for free. So Tom McClellan, Jay Kaeppel I know there's a number of people that do the sentiment and the little quantitative patterns. "Okay, this worked for the last 10 years".

Be really careful when you see this published research where the sample size is like under 20. Steve Moore always preached this that if you have something that worked 17 out of 20 years, say for example on a walk-forward basis, it's only going to produce 65 percent right around there, and that's just because you don't have a sample size that's large enough to get high enough confidence factor. But it still is entertaining to watch and it might just be one little variable that gives you an edge to trade a signal with your own system with added confidence.

Andrew: And so on sample size, what do you think is a relevant level to get some confidence?

Linda: Well, unfortunately it really depends on what you're testing, and as Nelson would aptly point out, the types of variables that he used might not get much more than 20 or 30. For me, when you're dealing

with short-term technical type of data –and it doesn't even have to be short-term but just pure price-based data, if you will, I found at a minimum I need 300, at a minimum, meaning that's not quite adequate.

Andrew: Wow! Three hundred over what type of timeframe are we talking there?

Linda: Well again, that's shorter-term data and it's going to have to be put into a context.

Andrew: Yeah, thank you very much, Linda, for bringing some of Nelson's work to us today. Is there anything else that you'd like to add before we wrap up?

Linda: No, I would encourage everybody just Google Nelson Freeburg or Google Formula Research. There's all kinds of little bits and pieces out there. I think there's an interview with Larry Connors, a two-part interview with Larry Connors that he did. I think he's got some old webinars that he did. You might be able to find some PowerPoint presentations. The last time I saw him give a presentation it was over in London in I think 2013 or 2012. That might be on the website for the MTA, the London MTA, Market Technicians Association. You know it's amazing once you start playing around with Google, all the kinds of relevant stuff that you can dig up.

Yeah, again it was a tribute to Nelson. He passed very suddenly. None of his stuff was really documented other than the Formula Research. No he didn't put anything on a website, didn't put anything on a book. That's just a lesson out there to people who feel they have something significant, find a way to include it in your will if you will.

I feel like myself, I've done enough YouTube or webinars for assorted organizations at this point, I really don't have anything new to say, but again I just wanted to do a tribute to a very fine ethical individual in this industry who did so much to promote other people and other people's works.

Thank you all for listening and honouring Nelson Freeburg with this podcast.

Andrew: Thanks, Linda. As you mentioned, Nelson was well respected amongst his peers and published some great work so it really was an honour to dedicate this podcast episode to him, and thank you so much for sharing with us today.

Linda: Thank you, Andrew.