A dynamical systems conference was held in Columbia, Missouri during 19–21 May 2006 in honor of Carmen Chicone's 60th birthday. Details of the conference—including photographs from the conference and conference banquet and slides from the mathematical lectures—can be viewed at the conference web site (http://www.math.missouri.edu/calendar/dynamic/index.html).

Carmen Chicone's Biographical Sketch

Carmen was born 4 March 1946 in Elmira, New York and grew up in Watkins Glen, New York, the son of Italian-American immigrants. He graduated from Watkins Glen Central School in 1960 and earned his undergraduate degree from the State University of New York-Albany in 1964. He studied at the University of Wisconsin, where he earned a master's degree and a (1977) Ph.D. in mathematics under the direction of Joel Robbin. His first job was a visiting assistant professorship at the University of Missouri, where he is now a Professor of Mathematics. He works in the areas of dynamical systems and applied mathematics. Carmen has published two books, one of which is a Springer-Verlag textbook with the title *Ordinary Differential Equations with Applications*. To date, he has published over 70 research articles. Carmen is married. His hobbies are fishing and woodworking.

My Self And The Times I Lived In[1]

My understanding is that Nigel Kalton and Loukas Grafakos proposed the idea of having this conference. Mark Ashbaugh[2] helped to provide the funding and Yuri Latushkin made this conference a reality. I thank them all very much and I ask you now to thank Yuri for all the work he has done.

I must also mention that we all know that nothing is done at the university without the hard work of the staff. Kim Dostoglou, Brenda Cook and Jessica White all deserve my thanks. I will certainly thank them in person next week. Thank you Dean O'Brien[3] for attending this dinner. I hope your lovely date[4]

[1] Carmen Chiocne's Banquet Speech, 20 May 2006, Reynolds Alumni Center, Columbia, Missouri.

[2] Chairman of the Mathematics Department

[3] Michael O'Brien, Associate Dean

[4] Gloria Smith

will forgive you for bringing her to an academic event. I also thank all of you who have come to this party.

Yuri told me to be entertaining!

It is certainly enough that you all came to this reception; you did not realize that you would be subjected to a speech. On the other hand, some of you may have thought it strange that I would not give a talk at my own conference. Well, in case you were wondering, here it is!

I am certainly not important enough in the mathematical community to deserve this celebration. But, I suppose that celebrating a long professional life is a good excuse for a party. I hope you are all enjoying the conference and the dinner.

This particular opportunity to speak will only come once in my life. So please indulge me for a few minutes. A 60th birthday is a time for reflection. I'd like to say a few words about myself and the times I lived in. I hope you might find something interesting in what I have to say.

I am reminded of a quote from Göthe. It is pretentious, I suppose, to include quotes from poets into speeches; but, I was indeed reminded of the first line, which I will soon recite, when I thought about what I might say. I looked up the quote in context and found that it was perhaps more appropriate than I thought. I read Göthe long before I knew how to pronounce his name. I thought it should be pronounced Gōth!

> *Mephistopheles*: We'll see the small world first, and then the great one too.
> What joy, what profit will be yours
> As you sail glibly through this course!
> *Faust*: But with this long grey beard on my face
> I lack for easy social grace.
> This bold attempt will never work for me,
> I could never get on in company,
> In front of others I feel small and harassed,
> I'll be continually embarrassed.
> *Mephistopheles*: Good friend, all that is needed, time will give.
> Once you have confidence, you will know how to live.[5]

This is an academic event. I suppose I should stay within the realm of my professional life, but that is not entirely who I am.

[5]J. Göthe, *Faust*, C. Passage transl., (Indianapolis: The Bobbs-Merrill Company, Inc.) 1965, p. 72.

Being 60 years old means that I can remember the start of the cold war. I had no idea of the significance of the history unfolding during my youth. My parents were shaped entirely by the great depression and the Second World War. My generation (the baby boomers) was shaped by the aftermath of that war: the cold war and the events of the 1960s.

I can remember with clarity duck and cover exercises. There were these mysterious people who lived on the other side of the world called Russians; Their only face: Joseph Stalin. They would subvert and destroy us with nuclear weapons if given a chance. That was the outside world. I could only wonder: Who are these Russians? Little did I know what was going on within the Soviet Union under the rule of this menacing figure.

I grew up in an ethnic family. My grandparents were more Italian than American; my parents quickly became Italian-American; and, their children became American. This is an oft repeated story that I do not have to recount here. But, it is only in America that families can rise so quickly out of the ghetto. The American dream is often fulfilled. For Italians, family is everything. Children become American out of a firm grounding within a loving family environment. On the other hand, there is certainly ethnic baggage. I acquired a perfect way to express this when I read the This Can't Be Yogurt company logo: "All of the pleasure, none of the guilt." My ethnic friends can fill in the rest of the story. But, if you are not from such a background, I will help you. For me the words were rearranged: "All of the guilt, none of the pleasure!"

I had a great high school mathematics teacher named Ruth Conrad. She taught me geometry and algebra and had a great influence on my life in more ways than I can recount here. She was excellent at axiomatic mathematics. But perhaps her understanding of what it all meant was not so great: I recall a particular day in a high school enrichment course taught by Miss Conrad during the New Math Era. We were discussing the cardinality of sets:

> *Miss Conrad*: Is the number of integers finite or infinite?
> *Class Response*: Infinite.
> *Miss Conrad*: Is the number of even integers finite or infinite?
> *Class Response*: Infinite.
> *Miss Conrad*: Is the number of people living on the Earth finite or infinite?

The class answered: "Infinite." We were immediately corrected: "Surely not," she said, "with all those people living in China!"

What did I know of China. Nothing. Who were these Chinese people? Communists!

I see the rigors that children are subjected to these days with special schools and parents who expose them to all manner of educational opportunities. (I am not opposed to this.) I was nurtured in a loving but less than intellectual atmosphere. I was more likely to be encouraged to put down that book and go out and get some fresh air; good advice that I should now take more often!

I lived through the introduction of the hydrogen bomb and the Cuban Missile Crisis while still in high school. We were glued to the tube.

The day of my college interview was the 22nd of November 1963. This was a day of a long conversation with my father—perhaps a passage to manhood—as I left his home and entered the great world. But, we also listened to a car radio on that awful day on a long trip from Watkins Glen to Albany, New York. It was a strong dose of reality and a monumental moment in the history of this country. Great struggles would begin, some continuing even until now: the civil rights movement, the equality of women, government misdeeds, and of course the Viet Nam War, which was already engaged but far from my thoughts.

Even at a less than great university—The State University of New York at Albany—a dedicated student could learn a lot. I think, looking back on it now, that some of my mathematics professors did not understand so much mathematics. But there were some bright moments: I had an advanced calculus course that included reading Spivak's[6] *Calculus on Manifolds.* I was struck by the power and beauty of Stokes's theorem. I also had a class in algebraic topology, which was perhaps the first time that I saw a modern idea in mathematics. My first exposure to the fundamental group and its applications made a lasting impression on me. I also learned that $d^2 = 0$ is one of the most important equations of the 20th Century. The academic life can be insular. There was a bus trip in November 1964. I remember looking at a news stand through the window of the bus at some bus stop somewhere in Upstate New York. The papers still had headlines: Nikita Khrushchev had been deposed 14 October 1964. I had not heard a word of this! I realized just how isolated I was? Who were these Russians? Would there be a nuclear war?

I graduated with a double major in mathematics and philosophy. I de-

[6]M. Spivak

cided to be "practical" and go to graduate school in mathematics! I applied to some graduate schools with no particular reason for my choices. I recall reading the AMS rankings where I noticed that Wisconsin was in their top 10. That was the only reason for my choice.

I would like to describe my trip from New York State to Wisconsin in 1968. I had never been farther west than Ohio nor farther East than Long Island. I was a child of the mountains and lakes of Upstate New York. My entrance to the Midwest was through the absolute alien flatness of Illinois followed by the shocking sight of the then operational steel mills of Gary, Indiana and blight of East Chicago. I had never witnessed air pollution before. The sky over Gary could just as well have displayed the banner "Abandon all hope ye who enter here!"

The green rolling hills of Wisconsin farther on made me feel like I had entered the Elysian fields. Entry from the west into Wisconsin—which came in later years—is no different: The planes of Iowa give way to the somewhat depressing feel and heat of Dubuque. But, upon crossing the Mississippi in summer and climbing over the river bluffs everything turns green and cool. The restful old town at Mineral Point, the limestone meadow trout streams, and the joys of Madison still lie beyond.

There is nothing quite like Madison and the University of Wisconsin. If you don't believe me, go there in the spring, summer or fall. Go out to the Memorial Union and have a beer on the shore of Lake Mendota. You will soon understand.

The mathematical life at UW was deep, diverse, and wonderful. In my time a remarkable cast of characters resided there: Joe Martin and a pure Moore method course in point set topology; Anatole Beck's Moore method course in functional analysis—no lectures, just do the exercises in Dunford and Schwartz[7]— Paul Rabinowitz talked about periodic orbits for Hamiltonian systems and a mysterious subject (which I now wish I had payed more attention to) called the mountain pass theorem; Charles Conley who made topology into applied mathematics; and a postdoc named Sivash Shashahani who gave great courses where I learned the modern Hamiltonian approach to mechanics and the Lie transform method. The proof of Moser's theorem[8]

[7]N. Dunford and J. Schwartz, *Linear Operators: Part I*, (New York: Interscience Publishers, Inc) 1957.

[8]J. Moser: Two volume forms on a compact manifold are related by pullback via a diffeomorphism if and only if they have produce the same value when integrated over the manifold.

(which plays a role in some recent work with my graduate student Oksana Bihun) and Weinstein's[9] proof of Darboux's theorem seemed to me then to be true works of art. I still think so.

I met Joel Robbin[10]. He had done something great. Joel had conquered one of the main unsolved problems of the Smale[11] program in dynamical systems by proving the structural stability theorem, among many other results. He taught me self reliance: "If I knew how to prove that result, I would write it up myself!" Of course he did much more than that. He represented what was possible. By watching him work, I had a glimpse of how a real mathematician thinks.

Also, there were fellow graduate students: Matt Brin, Hank Kurland, John Berge, Jim Selgrade, Chris Jones[12] and many others. We guessed that Chris was something special; he proved us right!

This was also the era of the Viet Nam war (1960–1974). Madison was a center for antiwar protest, punctuated by the AMRC[13] bombing in 1970 when a graduate student was killed. The smell of tear gas lingered on campus. I was not a true activist. My friends suspected I might be a liberal, which was so far right on their political scale that they thought me reactionary. During that time (1972) Richard Nixon brought a table tennis team to China. I got my first look at real Chinese people on television.

The Midwest Dynamical Systems Seminar was (and is) inspiring. It started with Clark Robinson, John Franks, Ken Meyer, Bob Williams, Joel and Charlie, and a few others. I learned a lot from this group. I especially remember a baptism at a meeting in Madison by Bob Williams who subjected me to my first "Russian style seminar." Joel asked me to give a talk at the last minute. I reported on some recent developments on limit cycles of polynomial vector fields. Bob peppered me with questions! Afterwards he told me what a great talk I had given. There was also a meeting hosted by Ken Meyer at Cincinnati where I heard from Mauricio Peixoto that Freddy Dumortier had discovered a gap in Dulac's[14] paper on the finiteness of the number of limit cycles of analytic vector fields. This led to some of my work with Doug Shafer on Dulac's problem. By that time I was also acquainted

[9] A. Weinstein
[10] My thesis advisor
[11] S. Smale
[12] The master of ceremony at the banquet where this speech was delivered.
[13] Army Mathematics Research Center
[14] H. Dulac

with Jorge Sotomayor, from whom I have learned a lot of mathematics over the following years.

The Midwest Seminar was also a time of great parties and long conversations while driving from Columbia to Evanston with Dick Swanson in the early days and later in the company of Dan Offin.

There were also lessons in life. My most vivid memory was a stop in Skokie Illinois—the home of some excellent Jewish Delis—where I stood in line to pay for a bag of warm bagels. The elderly women in front of me was short, thin and well appointed. I noticed she was wearing an expensive coat and was speaking with a thick accent. A few coins were dropped on the counter while money was exchanged for her bread. As she picked up the coins, she turned her wrist. Her sleeve pulled up. And there, for the first time, I was confronted with the reality of evil: a number was tattooed in black ink across her wrist. No words were exchanged between us. I don't know her story. I felt sadness and compassion beyond my understanding.

I arrived on this campus in 1977 as a visiting assistant professor and I have been here ever since. During my tenure, the Department of Mathematics has changed dramatically in size and quality. There are certainly many first-rate mathematicians in my department. I won't mention names; they certainly know who they are!

My wife and my mother-in-law[15] will now have to forgive me for mentioning another women. My first semester here, I had a date with a very attractive young lady. (I have spared you anecdotes concerning my first marriage and my divorce.) We were attending a concert on campus. While looking for a parking space, I had to drive by the mathematics building where I saw lights on in one of the offices on the third floor. Perhaps someone simply forgot to turn off their lights before leaving the building, but for me this was a transformational moment. While in the company of a beautiful woman, I was feeling guilty that I was taking time from my research! I assure you that I remained the perfect gentleman and did not strand my date on campus and return to work. But, I won't tell you all that might have happened later that night! I simply point out the natural conflict between life and work, a problem we all face. I've tried to achieve some balance, but perhaps that guilt I mentioned was too overpowering. I am probably still working too hard.

That brings me to the most important event of my life, which I had better

[15]Martha Jane Koonse

get to soon: I met my wife Jenny.[16] Our first date was a minor disaster. It was on a holiday–the 4th of July—when I could not find a restaurant open for business. To my good fortune, our relationship became much better after that! Jenny would like me to spend more time away from mathematics. But, she has been very understanding by still allowing me time to work. Her full-time job is taking care of me. You can guess that is no easy task!

I would like to mention just a few moments of my mathematical life.

I proved a nice result on connecting orbits for quadratic gradients, which led to my first publication. If I had known that there was a good application of this result (to conservation laws) perhaps I would have spent my career at a different university!

I worked with Richard Swanson on spectral mapping theorems, hyperbolic systems, and the Saker-Sell spectrum. There is a good story connected with one of our papers that Yuri can tell better than I. Dick and I wrote a paper with the title "Anosov does not imply infinitesimally ergodic" based on one of Joel's ideas. Yuri tells me that Professor Anosov (in Moscow) was aware of this paper and was heard to mention several times in departmental conversations "I definitely do not imply infinitesimal ergodicity!"

I worked on period functions with Freddy and polynomial vector fields with Soto.

Marc Jacobs was my mentor in applied mathematics. But, our joint work was as pure as pure can be. We solved a problem in ODE using the algebra of the Hilbert basis theorem and ideal membership.

I worked with Dave Retzloff and others on stirred tank reactors.

I learned a lot of physics from Bahram Mashhoon and even helped to make some contributions to GR[17], which seems amazing to me.

In recent years I have worked with Frank Feng, from Mechanical Engineering. There is very recent work on wave guides with Frank and my student Mike Heitzman.

Together with John Critser and my student James Benson, I have worked in cryobiology. Indeed, I stand before you as an adjunct professor of Veterinary Pathobiology.

I have worked with Yuri on invariant manifolds and spectral mapping theory.

I've enjoyed long conversations with Stephen Montgomery-Smith.

[16]The former Mary Jennifer Koonse

[17]General Relativity

Weishi Liu and I have worked together on singular perturbation and asymptotic phase.

Of course there were interactions with Ira, Jim, Calvin, John, Paul, Keith, Dennis, and others.[18] Ira, Nigel, and I wrote a paper called "The converse to the Cayley-Hamilton theorem." Also, Nigel and I wrote a paper on flat embeddings of the Möbius band. This paper was a lot of fun because it was cited many times over a period of years before it was published. I should mention that this work was inspired by a question of Moe Hirsch posed at one of the Midwest Dynamical Systems Conferences.

I helped Yuri write a book on evolution semi-groups, and I wrote book on ODE.[19] The 2nd Edition has just been published.[20] I should have set up a stand outside this room like you see at a music concert. You could all buy a copy on your way out!

So, in spite of the insulation of my youth, I actually met and worked with Russian and Chinese people, not to mention Europeans, Middle Easterners, South Americans, Australians, and Africans. I would have never visited a medieval city in Belgium, walked on the beaches of Rio, saw the red-light district in Amsterdam, or ate chinese food for dinner in a street market in Taiwan had I not pursued a career in mathematics.

Those very mysterious people who I only knew as communists—the Russians and Chinese—turned out to be my colleagues and friends. I hope they all know how much their friendship means to me. It's not just that they are wonderful people and great mathematicians. They symbolize for me the possibility that if everyone just listened to their heart instead of their political leaders, we could indeed all get along.

I have had contact with many students. My feelings about teaching are best saved for a different occasion. But, I must say that working with students is a true joy. To see Ben Mohamed[21] go out into the world gave me a lot of pleasure. I've also seen many gifted students appear at MU. One has only to look at this conference where Ben, Milena[22] and Roman[23] are speak-

[18] Ira Papick, Nigel Kalton, Calvin Ahlbrandt, John Beem, Paul Ehrlich, Keith Schrader, Dennis Sentilles, Dix Pettey, Richard Crownover

[19] Ordinary Differential Equations

[20] *Ordinary Differential Equations with Applications*, New York: Springer-Verlag, 2006.

[21] My second Ph.D. student.

[22] Milena Stanislavova

[23] Roman Shvydkoy

ing. I currently have four Ph.D. students who are all hear tonight—Jamie.[24] Oksana,[25] Mike[26] and Kenny.[27] It is by a miraculous convergence, which I don't fully understand, that such a bright crop of students would appear in the later years of my career. They are the source of a lot of work, but also great pleasure. I think they know how important they are to me. I only hope that I can help them find their way within the mathematical world.

I wish to conclude my remarks by reminding you that underlying our professional academic lives, especially in science, there should remain a sense of wonder.

The immensity of the Cosmos: How can you get your head around a deep look at the stars. I have come to know black holes, neutron stars, and superluminal jets. But, in research, these are reduced to equations on paper. The amazing fact is that they might actually be out there right now as I speak. Some city folk have never seen the night sky. This is a sad consequence of modern life. Truly, it is awesome beyond words.

There is wonder in inner space. How can it be that we are tied to physical bodies? Are we nothing but a chemical soup that produces the illusion of consciousness? What of mathematical genius? Where does it come from? Why don't I have it!

Of course, there is wonder in mathematics. Wonder certainly resides in the unsolved problem, the complexity of solutions of nonlinear differential equations, and the utility of mathematics in explaining the universe. After 60 years, I still feel it!

We have to be brave as we get old. The interior of the Cathedral of Saint Louis (which rivals the beauty of some European cathedrals) is completely covered with glass mosaics. Among the murals depicting the events of the old and new testaments, there is a small panel—the only one that remains vividly impressed on my mind—that depicts an hour glass with wings. A not so subtle reminder of where you are going when you are 60 years old.

While I have had a lifelong fear of the coming of the next ice age, the expansion of the universe is worse! Everything will inexorably fade away as the distances between stars, and indeed all other particles of matter, increase to infinity. Their temperature will approach absolute zero. What will be left of us then?

[24] James Benson
[25] Oksana Bihun
[26] Michael Heitzman
[27] Kenneth Felts

To add some balance to my life and to save myself from dark thoughts, I have pursued two hobbies: fishing and woodworking.

There are at least two sides to fishing in America: Fishing associated with glossy pictures of smiling overweight men wearing sun glasses and holding large fish, and fishing as a spiritual contact with nature. For me, fishing is a metaphor for the unconscious.

> Below the surface of the water
> where our sparse dry fly floats,
> beautiful and mysterious creatures reside.
> How pure the mind is
> during the moment before the strike.

Wood working is a family tradition now several generations old. You can put together a few pine boards and some bricks to make a serviceable book shelf in a college dorm. Or you can become a master craftsman and learn to make dovetail joints. On the other hand, you can read the book "The Soul of a Tree"[28] by my mentor George Nakashima and aspire to make a dead tree live again as just the right object. Each plank of wood has one perfect use; The artist's job is to find it. I have experienced the fulfillment of this challenge for myself, but only once so far.

I can only hope that while my brain is still functioning, I can find the perfect use for some of my remaining time.

I have tried my best to be righteous. I have done what I could to help people; I have never sought to do them harm. In my own way, I have tried to be a good person, a good husband, and a credit to my profession.

I hope that some of you have seen me in that light.
Thank you very much for coming and good night!

[28] G. Nakashima, The Soul of a Tree: A Woodworker's Refections, (Tokyo: Kodansha Press), 1981