

## Mark C. Nicely

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### BACKGROUND

I have been involved in casino game development and analysis since 1997, following a decade of work in computer engineering and engineering management (hardware, software, analysis, and algorithms).

I founded and lead the gaming math department for Silicon Gaming (SGIC), a highly innovative slot machine manufacturer. SGIC was started by casino industry experts and heavily relied upon regular consultation with industry leaders, which was extremely educational for me.

In 2001, I pursued gaming consulting, with my first two clients being WagerWorks, an offshoot company of SGIC focusing on legal Internet gaming, and Fleetwood Gaming, a slot machine manufacturer. I have continued to work on a myriad of casino gaming projects including gaming analysis, game design, software simulators and emulators, random number generator software development and testing, progressive jackpot systems design and operations, general casino operations support, player complaint investigations, Class II deal generation, regulatory submissions, patent development and prosecution, innovation process development, gaming education and gaming math.

In 2005, I became an employee of IGT, the world's largest slot machine provider, after IGT acquired WagerWorks. This opened entire worlds of new knowledge and design opportunities including multi-player gaming, cross-platform gaming, advanced game performance analysis, land-based game design standards, IP portfolio review, games roadmap planning, licensing evaluation/planning, and alternate development processes.

During this time, I also provided expert witness services for several federal gaming tax cases, most notably the Frank Gagliardi hearing which resulted in new case law. In all the other cases (8 and counting) the corresponding matter was either dropped by the IRS or otherwise settled to the client's satisfaction. I am currently engaged to provide report, deposition, and testimony for a major manufacturer in a contract dispute over a consumer brand.

### POSITIONS HELD

- **Founder, Game Inventor, Game Developer** --- Secret Sauce Gaming
- **Expert Witness on Gambling, Gambling Math & IP** --- Nicely Done Defense
- **Mathematician, Programmer, Game Designer, Analyst** --- Nicely Done Gaming
- **Gaming Designer, Manager, Distinguished Inventor** --- IGT / WagerWorks
- **Director Engineering, Product Manager** --- E.piphany / eClass Direct
- **Gaming Math Director, Product Dev. Co-Director** --- Silicon Gaming
- **Video Game Developer** --- Nicely Done Software
- **Co-Founder, VP Eng.** --- American Signal Processing
- **VP New Business; Program Manager; SW Lead** --- Imatron / Siemens
- **Project Lead, Hardware Engineer** --- Saxpy Computer
- **Hardware Engineer** --- ESL / TR

# GAMBLING TITLES

## TABLE GAMES

### Original Design

- ◆ 3 Card Double Happiness
- ◆ 3 Wheel Roulette  
(with Colour Up)
- ◆ Double Bonus Spin Roulette
- ◆ Hot Streak Roulette
- ◆ Texas Hold'em Shootout
- ◆ Triple Bonus Spin Roulette

### Highly Modified Math

- ♠ Vegas BJ (20+ Bonus)
- ♠ Win-Win Blackjack

### First-to-Market

- ♣ 21+3 Blackjack
- ♣ Double Attack Blackjack
- ♣ Power Blackjack
- ♣ Three Card Mulligan

### Ported

- Blackjack (5 generations)
- Roulette (3 generations)
- Traditional table suite:  
Baccarat; Caribbean Stud;  
Craps; 3 Card Poker;  
Texas Hold'em Bonus

## STEPPER SLOTS

### Original Design

- ◆ 3-Reel Hold-up
- ◆ Hot Reels
- ◆ MONOPOLY Multiplier
- ◆ Riddle of the Sphinx
- ◆ Silver Bell

### Ported

- Double Diamond
- Triple Diamond
- Five Times Pay
- Super Times Pay

## CDS/CLASS II SLOTS

### Original Design

- ◆ Bank Vault
- ◆ Roman Riches

### Custom Math

- ♠ Bayou Bucks
- ♠ Irish Gold
- ♠ Tiki Treasure

## VIDEO SLOTS

### Original Design

- ◆ Banarama
- ◆ Bet The Farm
- ◆ Dungeons & Dragons  
Fortress of Fortune
- ◆ Lucky Birds
- ◆ MONOPOLY Pass Go
- ◆ MONOPOLY Here & Now
- ◆ The Price is Right
- ◆ Vacation USA
- ◆ Wheel of Fortune Hollywood

### Highly Modified Math

- ♠ 50K/100K Pyramid
- ♠ ELVIS the King
- ♠ Pixies of the Forest
- ♠ Super Hoot Loot
- ♠ Wheel of Fortune Triple  
Action Frenzy

### Ported

- Cleopatra
- Cleopatra II
- Coyote Moon
- Garden Party
- Triple Fortune Dragon
- Wild Wolf
- Wolf Run

## VIDEO POKER

### Original Design

- ◆ Press It Up Poker
- ◆ Lucky Draw Poker
- ◆ Match Times Pay Poker
- ◆ Turn & Burn Poker
- ◆ X-Ray Poker

### Custom Math

- ♠ Bump It Stud
- ♠ Dead Man's Poker
- ♠ Flippin' Poker
- ♠ Phantom Belle Bonus
- ♠ Streak It Rich Poker

### Ported

- Game King Suite
- Phantom Belle Suite
- Triple/5/10 Play Suite
- Ultimate X Poker Suite

## BINGO/KENO

### Original Bingo Design

- ◆ Everyone's a Winner
- ◆ Millionaires Jackpot

### Custom Math

- ♠ Bingo Blitz
- ♠ Bingo Keno
- ♠ Hit or Miss Keno
- ♠ Krazy Keno Superball
- ♠ La Cucaracha Keno
- ♠ Lucky Star Keno
- ♠ Mardi Gras Keno
- ♠ Old Glory Keno
- ♠ Pick a Power Keno
- ♠ Power 369 Keno
- ♠ Power 7 Way Keno
- ♠ Power Double Deluxe
- ♠ Winner Takes All Keno

## LEISURE GAMES

### Original Design

- ◆ 5-of-6 Hi-Lo (2 titles)
- ◆ MONOPOLY on a roll
- ◆ The Price is Right Fruity
- ◆ Three-2-Win (3 titles)

## JACKPOT GAMES

### Original Design

- ◆ Big Win
- ◆ MJP Multi-Wheel Roulette
- ◆ MJP MONOPOLY
- ◆ WOF Red Hot Jackpots
- ◆ US Mint (stepper)

### Highly Modified Math

- ♠ Banarama Jackpot
- ♠ MJP Cleopatra
- ♠ MJP Cluedo

## JACKPOT SYSTEMS

### Original Architecture

- ◆ Silicon Gaming NV WAP
- ◆ WagerWorks online WAPs
- ◆ IGT online MegaJackpots
- ◆ IGT online Laddering MLP
- ◆ IGT Powerbucks

All titles are trademarked owned by their respective gaming company, including Action Gaming, Bally Gaming, Customized Casino Games, Diamond Game, Elvis Presley Enterprises, Fleetwood Gaming, Freemantle Media, Games Marketing, Hasbro, High-5 Games, IGT, Olympian Gaming, **PLAYSTUDIOS**, Nu Games, Silicon Gaming, ShuffleMaster, Sony, WagerWorks, and Wizards of the Coast.

# GAMING PATENTS

## Jackpot Systems

Dynamic Jackpot Banks	2011/0111843
Dynamic Meter Injection	8449388, 8096874
Extra Chances Jackpot	8496520, 8162746
Laddering MLP	2014/0094293
True Pay Multicurrency Jackpots	8512132

## Jackpot Game Features

Personal Progressives	8408993, 7666093
Wager-Based Symbol Eligibility	7507156

## Multiplayer Bonusing Frameworks

Cross-Title Community Bonusing	8545313 + 2 other
Garden Of Gaming Delight	8662980, 8475265
Piece Of The Action	2011/0230251
Treasure Map / Keno Race	8070587

## Multiplayer Features

Bees & Honey Community Bonus	8118666
Fish Frenzy Race Bonus	2011/0111827
Halo-Style Shooting Bonus	8393968
Interactive Bonus Set Selection	2014/0087809
Soldiers And Assassins	2013/0084941
Ticket-To-Ride Bonus Selector	2012/0108319

## Slot Game Formats

Chuzzle-Style Sliding Symbol	2014/0066162
Dual-Sided Cascading Symbols	2014/0087825
Hexagonal Slots	6676511, 6241607
Pin Board Driven Slot Game	8366533, 8366532
Player-Controlled Sliding Window	2014/0087832
Where's Waldo / Glyphtronic 3000	8602869, 8545307

## Slot Game Features

Hot Tail Win Trail	8678908
Per Payline Multipliers	8419525, 8277305
Regenerative Power Ups	8672741, 8672740

## Bonus Features

3d Award Contoured Bonus	8079903
Betside: Wheel Bonus Side Bet	8628412, 8517824
Corral The Wild Horse	8517827, 8287364
Variable Depth Treasure Chest	8210935

## Video Poker Games

8-Way Poker	7862417, 7614946
Dual-Sided Video Poker	2014/0087798
Match Times Pay	2013/0260869
Phantom Belle Bonus	6196547
X-Ray Poker / Turn & Burn Poker	8210533 + 2 other

## Table Games: Blackjack

Blackjack Hot Streak	8485880, 8235780
Turn The Tables Blackjack	8197319, 8262448
Winning Streak Blackjack	2014/0087801

## Table Games: Roulette

Concentric Multi-Wheel Roulette	8517381 + 3 other
Double Bonus Spin	8152171, 7674172
Dual Streak Roulette	8562419
Hot Streak Roulette	8342941 + 3 other
Multiple Bonus Wheels Game	2013/0059647

## Table Games: Casino Hold'em

Back-A-Winner Hold 'Em	8137174
Casino Hold'em One-On-One	8353751
Casino Hold'em Shootout	7748714
Mid-Proposition Hold'em Bonus	8449363

## Table Games: Pai Gow

Pai Gow Draw Poker	8696424
Pai Gow Poker Hand Setting	8216039
Three Card Double Happiness	8177616

## Table Games: Other

Three Card Draw Poker	8695984, 8534671
Hot Streak Baccarat	2010/0117299

## Electronic Tables

Deal Customization	8678921
Electronic Dice Shaker	8622391 + 2 other
Tournament Roulette	8641515

## Mobile Devices

Mobile-EGM Interactivity	2013/0084963
Player Linked EGM Audio	2013/0053144
Remote Hand-Held Wagering	8529345

## System Features

Award Frequency Analyzer	2011/0014969
CDS-Based Bonus Persistence	2011/0003627
Crash Or Carry	2013/0203482
Level-Up Plus	2014/0087855
Remote Client Selective Stacking	8668574, 8591314
Alternate Outcome Displays	2013/0079097

## Numbers/Leisure Games

3-2-Win / Match 3	8641509 + 2 other
Full Ride Poker Dice	7624986
King Arthur / 5-Of-6 Hi-Lo	7338371
Monopoly On A Roll	7828294, 7533885

Does not include filed or in-process patents not yet published, nor patents filed or granted internationally.

# GAMING SPECIALTIES

## Master Level

- Progressive jackpot systems and game design
  - Designed, implemented and launched land-based and online WAPS
  - Winner of IGT 2013 Patent of the Year for online MegaJackpots system
- CDS (central determination system) game design
- Table game analysis and design
  - Invented, designed & built industry-leading titles: Double Bonus Spin Roulette, Triple Bonus Spin Roulette, Hot Streak Blackjack, Hold'em Shootout
- Gaming analytics
  - A/B testing & analysis for revenue optimization
  - Play history analysis for gambling loss estimation

## Expert Level

- Stepper slot design
- Video slot design
- Game & bonus features
- Keno & bingo games
- Leisure / numbers games
- Gaming IP

# SPECIFIC SKILLS

## Management Areas

- Software Engineering
  - scientific
  - interactive
  - analytic
- Game Development
  - math & design
  - graphics & audio
  - game, platform & RNG s/w
  - math validation testing
- Product Dev / Manufacturing
  - S/W, H/W, firmware
  - user & regulatory docs
  - math, physics, materials
  - supply & manufacturing

## Gaming Development

- Online gaming & casino ops
- Class III: slots & video poker
- Class II: CDS & bingo-based
- Proprietary table games
- Wide Area Progressives

## Gaming & Financial Analysis

- Casino operations
- Game performance
- Player disputes
- Tax court expert witness
- ROI, NPV, Break Even
- Business plan financials

## Product Management

- Product specifications
- Customer / Investor presentations
- Market research / CI
- Field research – customers
- Focus testing – users
- Marcom creation
- PR & Ad agency direction
- Marketing effectiveness testing

## Technical Skills

- Software
  - C, C#, C++, Java, R
  - Excel w/ VBA, Sigma Plot
  - assembly / firmware
- Math
  - inferential statistics
  - probability, combinatorics
  - non-linear optimization
  - cryptography
  - software-based enumeration
- Business
  - business plans
  - licensing contracts
  - M&A due diligence
- Legal
  - patent search & analysis
  - patent writing
  - expert witness reports
  - court & deposition testimony

# EDUCATION

## Rensselaer Polytechnic Institute

B.S. Computer and System Engineering  
 Electrical, Computer & Systems Engineering Honors Program graduate  
 Four-year academic full scholarship

## Continuing Education

### Math

- Probability & Statistics UCB
- Stochastic Processes Stanford
- Applied Statistics UCB
- Fourier Transforms Stanford

### Engineering

- Java; R; Design Patterns UCB
- C#; C++; .NET; OLE Prof
- Telecommunications UCB

### Finance, Management, Information Science

- SW Project Management Prof
- Financial Analysis UCB
- Corporate Finance Prof
- Information Design Tuft
- Slot Performance Analysis UNLV

### Legal

- Intellectual Property Law UCB
- UCB Paralegal Program UCB
- Uses of Discretion in Law Oxford
- Expert Witness Training Prof

Legend

<b>UCB</b>	UC Berkeley Extension	<b>UNLV</b>	Univ. Nevada, Las Vegas professional course
<b>Stanford</b>	Standard University graduate courses	<b>Tuft</b>	Edward Tuft training course
<b>Oxford</b>	Merton College, Oxford summer course	<b>Prof</b>	Professional training such as LearningTree, PMI

# DETAILED EMPLOYMENT HISTORY

**Secret Sauce Gaming, San Francisco Bay Area, CA** – 2014 to present

*(Gaming IP development for licensing and sale)*

**Founder, Game Inventor / Developer**

- Develop and patent novel gaming concepts for sale or lease to the industry
- *Clean Sweep Baccarat* patent sold to Walker Digital Table Systems Apr 2017

**Nicely Done Defense, San Francisco Bay Area, CA** – 2006 to present

*(Sole Proprietorship Consulting – expert witness analysis & testimony)*

**Expert Witness on Gambling, Gambling Math and Gambling IP**

- Testimony and report in Gagliardi trial (new taxpayer-friendly case law established)
- Deposition and report for *Bally Gaming adv. Top Gun Gaming*
- Consultation, analysis & reports for assorted clients with gambling earnings disputes

**Nicely Done Gaming, San Francisco Bay Area, CA** – 2001 to present

*(Sole Proprietorship Consulting – gaming design & analysis – www.NicelyDoneGaming.com)*

**Mathematician, Programmer, Game Designer, Analyst**

LARGEST RECENT CLIENTS	Patent Development	Table Games & Video Poker	Video-Reel Slot Games	Stepper-Reel Slot Games	Skill-Based Gaming	Game Econ & Meta Games	
Deck of Dice	✓✓✓	✓✓✓	✓			✓✓	Feb 2015 - present
Game Co	✓✓✓				✓✓✓		Nov 2015 - present
Gamiker	✓✓✓	✓			✓✓		May 2015 - present
GSN			✓✓	✓✓✓			May 2015 - Dec 2016
PLAYSTUDIOS		✓✓	✓✓✓	✓✓		✓	Apr 2014 - present
Seven Deuces	✓	✓				✓✓✓	May 2015 - Dec 2016
Walker Digital Table Systems	✓	✓✓✓					Apr 2014 - present

IGT – Interactive Division / WagerWorks, San Francisco, CA

Oct 2002 to Mar 2014 (part-time employee);

Oct 2001 to Oct 2002 (contractor)

Legal online casino software for the European market

- Math model development for online casino games (reels, table, cards, keno)
- Math analysis tool development, process creation & regulatory documentation
- Player complaint research and response, gaming performance analysis
- Manage all patent and trademark issues for the interactive division

Diamond Game Enterprise, Chatsworth, CA – 2007 to 2008

Class II Slot Machine Manufacturer primarily for Oklahoma

- Math model development for slot and card games
- Game design and development
- RNG development and testing
- Class II slot outcome generation software

Fleetwood Gaming, Billings, MT – 2006 to 2008

Class III Slot Machine Manufacturer for Montana

- Developed a proprietary video poker analyzer
- Proprietary keno and video poker math model design

Miscellaneous gaming clients

- Game design, math model development, card game simulators
- Patent claims development, gaming patent evaluation
- RNG testing, bankroll ruin analysis, financial modeling, etc.
- Jurisdictional regulatory review and report

**E.piphany, San Mateo, California (acquired eClass Direct) – 1999 to 2001**

**Director, Development / Product Manager**

**eClass Direct -- 25 person e-mail service business start-up**

- recruited, organized and ran the software engineering team
- established development methodologies, design & code review processes, etc.
- created and managed next generation product & services roadmap
- executive staff duties: strategic planning, corporate policies, M&A
- corporate responsibilities: Web site, competitive intelligence, recruiting, IT

**Silicon Gaming, Palo Alto, CA – 1997 to 1999**

*(Manufacturer of Las Vegas-style multimedia slot machines. Public company which grew to 80 employees and \$20 million in sales prior to acquisition by IGT.)*

**Director, Product Development**

- co-directed game development group (24 people)
- helped design & implement new management structures & development processes
- developed complete R&D program including new game development, industry watch, table game review, open house reviews and outside game idea evaluation
- lead technical licensing discussions with outside gaming companies

**Director, Gaming Mathematics**

- gambling proposition design for assorted reel & card casino games
- card and reel game simulation, emulation and chi-square analysis
- created the department - staffed, trained and supervised team of 3
- responsible for all game-related IP, lead or contributory inventor on 15 patents

**Nicely Done Software, San Francisco, CA – 1993 to 1997**

**Freelance Video Game Developer**

- video game development: assembler for GameBoy, C for Sony Play Station
- game list: 5 sports, 1 platform, 2 fighting, 1 robot ball game
- lead development of 3D games for Play Station and Sega Saturn
- assorted graphics processing and software development tools in C

**American Signal Processing, San Jose, CA** – 1992 to 1996

(Start-up pursuing DOD contracts / product development)

**Co-Founder / Vice President, Engineering**

- pursued contracts for simultaneous microwave signal detection for IFM receivers
- co-developed various DSP and analog algorithms
- developed hardware architectures and examined ASIC implementation issues

**Imatron, Inc., South San Francisco, CA** – 1989 to 1992

(Manufactures CT scanners and other medical imaging equipment.

Public company with 140 employees.)

**Vice President, New Business Development**

- coordinate definition, evaluation, negotiation and finance of new business opportunities working directly with the President/CEO
- helped launch our service business subsidiary

**Program Manager**

(the C-150 for Siemens replaces the previous product line with improved RAS, significant size reduction, higher resolution, and new scan modes.)

- managed all aspects of C-150 CT scanner product development program
- **all program deadlines completed on time, to spec, under budget**
- program involved over 50 people in software, mechanical and electrical engineering, physics, marketing, clinical sciences, purchasing, field service, regulatory affairs, QC/QA, production & manufacturing integration

**Software Project Lead**

- led 3-person project to develop electron beam control software which, performed a multi-variable, non-linear optimization during auto scanner operation to provide superior image quality – touted to customers as the most sophisticated functionality ever created by Imatron
- defined functional requirements, wrote software specifications and conventions, developed the overall design, established & tracked schedules
- 30k lines of C with embedded assembler for VME-based 68020 under UNIX

**Saxy Computer Corporation, Sunnyvale, CA** – 1984 to 1988

(Venture capital start-up which grew to 80 employees. Designed, manufactured and installed several Matrix 1 supercomputers.)

**Project Lead / Hardware Engineer**

- key contributor to the design & development of the Matrix 1 supercomputer from inception to manufacturing release & customer installation
- lead architect & inventor of the MPU subsystem (1000 megaflop, systolic array), wrote all specs, coordinated technical details & lead the integration team
- analyzed and developed hardware for the ECL/TTL-based MPU compute and I/O controller board set (4 boards, 1000+ IC's, PAL intensive)
- developed 1000 lines of horizontal (108 bit) microcode
- defined the system floating point arithmetic and exception handling

**ESL/ TRW, Sunnyvale, CA** – 1983 to 1984

(Advanced Technology Division of large defense equipment corporation.

Worked on a sonar based systolic array beamformer project.)

**Hardware Engineer**

- developed the floating point, vector processor based, median frequency filter board
- generated all of the microcode (80 bits) for the vector processor controller
- defined and implemented the instruction set (Unix-based system)
- developed the systolic array boundary-cell square root unit
- completed a detailed numerical analysis and simulation of the inverse square root algorithm in order to optimize hardware and performance