Crime Seen

He examined bloodstains from O.J. Simpson's car, identified the bones of the Russian royal family and has helped solve hundreds of homicides and violent crimes in New Zealand. SARAH LANG meets John Buckleton — home-grown "CSI" star and one of the world's top forensic scientists.

PICTURES: STEPHEN PERRY

Dr John Buckleton throws himself down on the floor of a corridor at the Institute of Environmental Science and Research (ESR), wildly waving arms and legs. He's recreating the scene of his "first great crime" — a homicide he investigated as a fresh-faced forensic scientist in 1986.

On the wall behind his enthusiastic re-enactment of the murder, there's a giant storyboard pinned with photos, all taken from slightly different distances and angles, showing a man's body lying prostrate in a farmyard.

"Mr Bill Worrall of South Auckland lies dead in a pool of his own blood on his share-milking farm," says Buckleton, adopting the deep, dramatic timbre of a movie voiceover, before rewinding to the crucial minutes that preceded the shooting.

"Mr Worrall hears a dog barking — he's had trouble with petrol being stolen from his property — so he gets up, grabbing his shotgun. His wife says, 'Be careful, dear'.

"He goes outside and receives a shot to his left side, fired from 12.5 metres, which injures but doesn't incapacitate him. But the assailant is out of ammunition [he has a single-barrelled shotgun]. So Mr Worrall, barely able to see in the dawn light, turns around with his double-barrelled shotgun and shoots… Boof! Boof!"

Buckleton speaks slowly, deliberately, with measured pauses.

"One shot strikes there, and there," he points to a fence in the photo display. "The assailant is struck by the ricochet, causing minor injuries to his face. He reloads, runs up to Mr Worrall and shoots him in the arm from 1.5 metres away. It breaks his arm. Mr Worrall calls out to his wife, 'Help me, Kerry!'

"Kerry says, 'Sod off, I'm paying $15,000 to have you shot this morning — why would I help you?'

"Mr Worrall looks up at his assailant and asks, 'Why me, mate?' and the guy says, 'Nothing personal', as he reloads and shoots him in the heart."

This is where Buckleton clutches his chest and starts thrashing around on the ESR's institutional lino, imitating Worrall's death throes. So much for pointy-head, pedantic scientists — this guy would be great on the stage.

John Buckleton, 48, has a powerful frame and presence, a salt-and-peppery beard, silver chest hair ruffling out of a V-necked shirt, and

bright blue eyes that mostly maintain an amused expression but flick to an interrogative steely gaze when required.

"Right, so nearly all of that is true," he says. "I can reconstruct where everyone went and I've slotted in the words that were later provided by the shooter." (The wife's speech, he admits, is dramatic conjecture.)

Kerry Worrall called 111 and Buckleton arrived at the scene at 7am, an hour after the murder. Gathering forensic evidence, he reconstructed a detailed scenario of events — so precisely that when local bowling club manager Brian Tomlin turned up at a hospital A&E with suspicious facial injuries, staff alerted the police and Tomlin was taken in for questioning. He denied involvement at first, but confessed when police presented him with Buckleton's reconstruction.

Kerry Worrall, who'd separated from Bill, then moved back into the family home, planned to pay Tomlin $15,000, says Buckleton. "She was going to use half her husband's life insurance money to have him shot.

"After she was released from jail, she appeared in a women's magazine article saying he abused her. Well, he can't answer back. Where's the victim's rights here?"

> "Sod off, I'm paying $15,000 to have you shot this morning — why would I help you?" — John Buckleton gets into character as he runs through a murder reconstruction.

That 1986 case is still used by ESR (the sole forensic science provider to the New Zealand police) as a training model to show how first-rate forensic work can aid an investigation.

Not a bad effort for a 27-year-old thrown headfirst into homicides after attending a handful of minor crimes. And from the Worrall case, Buckleton launched into two decades of casework, probing more than 2000 violent crimes, 500 of them homicides.

But his primary research passion goes deeper, into profiling of DNA, the molecules that encode genetic information — and that's where he's really made his name. DNA profiling as part of forensic science didn't nab its first offender until 1988, in the UK. Buckleton was one of the scientists who sought to bring a logical rigor to the interpretation of DNA evidence, applying to the new technology methods he'd developed to analyse other types of evidence. From there he carved a career as a DNA evidence interpretation expert and is now in worldwide demand as an expert witness, speaker, teacher, trainer and consultant.

He's also written more than 100 academic papers and articles and four books — a publication output a full-time academic would be proud of, let alone someone handling a heavy load of casework. In 2005 he wrote *Forensic DNA Evidence Interpretation* (with contributions from Auckland statistics professor Christopher Triggs and Australian forensic biology lecturer Simon Walsh). It's now the international DNA guide for forensic scientists.

Buckleton has been an ESR principal scientist since 1998; he was the youngest scientist appointed to the position. ESR general manager Wayne Chisnall says this is a personal achievement requiring "a strong research background, a considerable list of publications, an international reputation and good leadership qualities".

In July 2006 Buckleton gave up casework "for the time being" to concentrate on exploring numerical models that improve the efficiency of crime-solving processes.

On a busy Auckland suburban street, a driveway hedged off from neighbouring homes winds up to the Mt Albert Research Centre. It ends at ESR, a stark concrete building where Buckleton has spent many of his waking hours in the past 23 years. Inside, it's hospital-like with wide corridors and swinging doors; only peeks through windows to labs and offices reveal the centre's diverse endeavours.

Grinning at everyone he passes, Buckleton strides past the drug lab where they're testing seized methamphetamine, past a room where inspectors peruse Customs-confiscated food, past the "deluge shower" (should anyone get contaminated) and past the scrubbed white walls of the criminal forensics labs.

There's a closet stacked with nearly-full bottles of wine, which ESR tests for export certification ("They used to let us take them home after testing, but not any more," he says, sounding disappointed at such bureaucratic miserliness.)

"This is the real world down here. This is where I grew up." From 1986 he juggled general casework with lab work; from 1996 he specialised in firearm crime scenes.

We reach his shoebox office on the third floor; it's hardly a quiet working environment, as heels clonk along the linoleum corridor and loudspeaker announcements blast through the building. His computer's as he left it: on the Wikipedia website, where he's been correcting details on two cases he's been involved in.

Straddling his chair, Buckleton pulls out a scrapbook thick with newspaper stories on his cases — everything from burglary to rapes to multiple homicides. "But the most interesting cases were usually minor ones the public never heard of, yet with fascinating little puzzles," he says, running through a suspected homicide he hypothesised, then demonstrated, was a three-shot suicide. "Just because a criminal case is in the media doesn't mean it involves good science."

But it's those high-profile cases we're most curious about, right? Like the 1989 Coromandel murder of Swedish tourists Urban Hoglin and Heidi Paakkonen. (David Tamihere was handed down a life sentence in 1990 for their murders.) With no bodies to examine, Buckleton says, his initial investigation was "simply routine matching work", including tracing back to Tamihere's property the paint and body filler that altered the appearance of the tourists' car.

Scott Watson? While Buckleton didn't fly to the Marlborough Sounds, he did analyse forensic evidence including paint and the DNA of hair found on Watson's yacht. (In 1998 Watson was sentenced to life for the murders of Ben Smart and Olivia Hope). David Bain? Buckleton reviewed the crime scene evidence for the 1997 Police Complaints Authority report that vindicated police handling of the case.

He won't opine on the guilt or innocence of Tamihere, Bain, Watson or others — and it's not a matter of keeping opinions private. "I desperately avoid ever letting myself have an opinion on whether or not they did it." Not an easy task, but something he's worked at.

Occasionally, Buckleton's reluctant to give specific forensic investigation details, citing "ongoing criminal learning" through exposure to crime in the media, particularly on TV. It's known as the CSI effect (based on the US television series *CSI: Crime Scene Investigation* and two spin-off shows). "We don't want to educate [criminals]."

When probed beyond his comfort zone, Buckleton fixes his gaze and remains silent. He refuses to fill the holes in a conversation with reassuring blather. But when asked if criminals are careless, one of these pauses is followed by a vehement nod. He's not elaborating, however. After a magazine article on real-life forensics mentioned a method criminals used to expunge DNA, a copycat technique was employed a few weeks later.

John Buckleton dons mask, overalls and double-layer gloves before entering the Institute of Environmental Science and Research's LCN lab, where miniscule DNA samples are scrutinised.

Are real-life forensic scientists anything like their TV counterparts on *CSI* and *SVU* (Special Victims Unit)?

Hardly, laughs Buckleton. Although not a crime show aficionado, he's watched a few episodes and has a friend who's a forensic consultant on *CSI: Miami* (the most popular TV programme in the world, according to an international survey based on 2005 Nielsen ratings).

"The reality isn't at all glamorous. We're not as good-looking as them, for a start. Everything happens slowly, and we don't interview suspects." The fictional criminalists also speak with a certainty that their real-life counterparts do not.

Though Buckleton mainly serviced the North Island, he travelled as far south as Queenstown to work on cases.

On call half of his working hours, he had to be ready to drop everything. "I'd get a phone call — it always seemed to be at 2am — then I'd vanish for three days."

Once he had to leave a Boxing Day family gathering; another time he had to make a sudden exit from his son's birthday party. "Sometimes I'd drive six hours to a crime scene, then catnap in my car until the police cleared me to go in. By that time any kind of buzz was well and truly gone," (even if the body wasn't, in homicide cases).

"I'd be gowned up to the nines, then I'd build a road in to the body with little stepping plates, trying to pick a route I didn't think the perpetrator would have taken.

"I'd work away quietly, being careful, just trying to see everything, identifying the main bits of evidence, swabbing and preserving them, and getting them photographed in situ."

If it was a homicide, he'd then go from crime scene to post-mortem, observing the pathologist's work, "to arm me with knowledge on things like distance and angle, and [collecting] fingernail scrapings".

At Urban Hoglin's autopsy (his skeleton was found two years after his death), the pathologist — finding no evidence of harm — was speculating the tourist died of natural causes, but Buckleton muscled in, inspecting the neck bones and finding nicks from a knife that had sliced two vertebrae.

In 1999 in Samoa, Works Minister Luagalau Levaula Kamu was shot in the back while MC-ing a Human Rights Protection Party celebration in a school hall. Buckleton, flown in from New Zealand, worked out that Kamu had been shot through a gap in the wall. Attempting to show how a firearm might form marks inside something hollow, he shoved a gun in a toilet roll and fired. "It splintered into 40,000 pieces, so that wasn't my greatest idea," he laughs.

But marks around the hole in the wall were matched to a specific make of gun, and other forensic evidence, including cigarette butts left at the place where the shooter stood implicated Eletise Leafa Vitale (who in turn implicated his father Leafa Vitale and father's friend Toi Aukuso — both MPs and counter-reformation activists wanting to overturn the Samoan Government). All three got life sentences.

Buckleton clearly misses the thrill of the chase. At the mention of Pakistan cricket coach Bob Woolmer's death — first thought to be a homicide, then a result of natural causes — his eyes light up. If only he could have swabbed that hotel room in Kingston, Jamaica, how quickly that case might have been solved.

You'd think a forensic scientist who'd attended so many gruesome scenes might become immune to the horror.

No, says Buckleton, some disturbing scenes are still imprinted on his mind, especially the Waikato farmhouse he entered on the morning of June 4 1994 to find the bloody bodies of elderly Te Akau couple John and Josie Harrisson, shot to death two days shy of their 50th wedding anniversary.

He felt so "sick to the bone" at the scene he had to go outside for a deep breath, steel himself, then set to work gathering evidence and reconstructing the events (Buckleton favours present tense): "Two young males with a .22 rifle sneak into the house after dark to steal the proceeds from the Harrissons' roadside stall. When one of the males coughs, it awakes Mr Harrisson. One of them shoots [Harrisson] through the back, severing his spine, then goes into the bedroom and shoots Mrs Harrisson, killing her instantly. But Mr Harrisson is making noises, so 'Male One' hands the gun to 'Male Two', who shoots into [the victim's] dentures, then goes back and shoots Mrs Harrisson again, although she's already dead. Mr Harrisson is still not dead so they shoot him in the head and steal the money."

Arrested on Waiheke Island three days later, Gresham Marsh, 21, and Leith Ray, 18, immediately confessed and were later sentenced to life imprisonment.

Recounting even the goriest details, Buckleton speaks matter-of-factly, in the manner of his talks for trainees. But once he's dispensed of the facts, emotion creeps in.

"After [Marsh and Ray] were caught I walked into the Hamilton police station carrying a heavy metal forensics kit in each hand. One of them smiled at me. I thought, 'You arse, you killed these people and you're smiling at me?' Honestly, if I hadn't been holding those kits I would've knocked him out. That's as close as I've got to that. It's just the brutality inflicted on quiet, innocent people.

"You can sort of understand people losing their rag in a bar-room brawl, but some kinds of crime are incomprehensible to me. Stealing six-year-old children and killing them, creeping into quiet old people's houses in the middle of the night and shooting them, you know?"

Mostly he's managed to compartmentalise the dark side of humanity he encountered, however. "You just focus on the little bit of the world you can change rather than the big bit you can't."

In criminal trials, he says, a defence lawyer speaks for the defendant, a prosecutor speaks for the Crown, but there's a third voice: that of the forensic evidence.

After more than 200 appearances in the dock he still gets nervous testifying and devotes many hours to preparation. A thorough reconstruction of events early on is crucial even with guilty pleas, he says, particularly if there's a plea of self-defence.

ESR forensic programme manager Keith Bedford says Buckleton has a commanding court presence. "He's known for translating complex technical information clearly and unflappably in a challenging, adversarial situation."

Bedford says he knew Buckleton was a "brilliant" forensic right from the start.

He has a glowing track record. But does he ever review cases from the past, wondering if the outcomes would have been different with access to today's forensic techniques? Buckleton: "I think all forensic scientists have this terrible fear of committing an injustice. And techniques have advanced so much that my early work looks retarded. You wish you could take the future back to the past, but you can't."

As for shows such as this year's *Inside New Zealand: What's Your Verdict?* that re-examined evidence from controversial crimes, including the Swedish tourist murders, Buckleton shrugs them off, unconcerned about a "TV jury's" pronouncements.

But there's been no escaping speculation surrounding the most controversial case he's been involved in.

When O.J. Simpson was charged with the murder of his former wife Nicole Brown Simpson and her friend Ron Goldman in 1994, Buckleton happened to be in the US working on DNA evidence interpretation with Dr Bruce Weir, a

renowned forensic statistics expert. They didn't attend the murder scene or carry out laboratory analysis, but they interpreted forensic evidence in preparation for court testimony. Under "ridiculous" time pressure (they were still receiving evidence to begin work on *after* the trial began), the pair computed tricky calculations on "mixtures" — samples with DNA from more than one person.

Weir testified that the stains in O.J. Simpson's car had the profiles expected if they were a mixture of blood from the suspect and the two victims.

With forensic testimony apparently over and Weir lecturing in Spain, the judge called Buckleton to provide further interpretive testimony. He was at Heathrow Airport, London, hurriedly doing calculations, when Los Angeles court officials called to cancel. "I can't say I was sorry," he says, speaking disgustedly of bad police practice. (Among their evidence-spoiling actions, detectives used towels to soak up the blood rather than leaving it untouched for forensic investigation, and vital scenes were potentially cross-contaminated several times.)

"Everything had been done too late, and done badly."

O.J. Simpson was acquitted in 1995. "While I never let myself have an opinion on whether someone did it, the evidence [in this case] was incredibly strong [including the fact that] O.J.'s blood was at the scene. But if the evidence is ruined you can't convict someone."

Is it any different working on a case that's in the public eye? "At the time you don't feel there's anything special about it at all. The O.J. case was just a double homicide."

Buckleton admits he'd always had an interest in the Romanov dynasty of Russia: "As a boy I put together a file on it." Little did he know that as a grown-up he'd be able to say nonchalantly, "I did the Tsar".

On July 17 1918, Bolshevik revolutionaries butchered Tsar Nicholas II — Russia's last monarch — and his family. But their bodies were never accounted for, and mystery surrounded their assassination for decades. From 1920 Polish woman Anastasia Manahan (usually known as Anna Anderson) made numerous public pleas claiming to be the Tsar's youngest daughter Anastasia.

In 1991, nine skeletons were exhumed from a shallow woodland grave near Yekaterinburg in central Russia. Buckleton was on a research secondment at the UK's Forensic Science Service when it was asked to analyse the bones. (He's had the odd stint working overseas, but has resisted foreign offers and pursued his career in New Zealand — for no other reason, it seems, than "it's home".)

DNA technology at the time allowed the UK service to apply "forensic mitochondrial DNA typing" (mtDNA), which uses distant relatives as references when there's no surviving immediate-family members. Buckleton contributed key research on dealing with the problem of heteroplasmy (where there's a mixture of more than one type of mitochondrial DNA within a cell), by demonstrating how to analyse the presence of different types of mitochondrial DNA, how to take mutations into account, and thus how to identify the predominant mitochondria.

The UK service confirmed the skeletons belonged to the Tsar and Tsarina, three of their five children and four servants. Because a son and a daughter were not identified, many people believed Alexei, the heir to the throne, and Grand Duchess Anastasia, the youngest daughter, had escaped the killings.

Anderson had died and been cremated in 1984. But in 1993 the Forensic Science Service was asked to test six hairs, given to her husband as a memento, and a section of her bowel preserved from a bowel cancer operation. Using the mitochondrial technique developed by Buckleton and his team, the service proved Anderson was not Anastasia but Polish-born Franziska Schanzkowska.

Buckleton's ground-breaking mitochondrial DNA interpretation knowledge also saw him at the Pentagon — as a very closely escorted guest — in 1994, following North Korea's release of American soldiers' remains from the 1950 Korean War.

No one knew how to identify them. "If you were a young soldier in 1950 you probably had no children and your parents had likely died [in the intervening years]," says Buckleton. "So you have the soldiers' bones but no immediate family with which to compare DNA."

As with the Romanovs, distant relatives provided the clues. Advised by Buckleton, the Pentagon's Washington scientists were able to identify around 8000 bodies.

He also helped speed up DNA identification of bodies in the wake of Thailand's Boxing Day 2004 tsunami, by developing and customising a victim identification software package for the DNA laboratory of Bangkok's Central Institute of Forensic Science. It enabled the new lab to undertake pedigree analysis (matching a dead person's DNA with the DNA of living relatives) before samples were ruined by heat and humidity.

> "You can sort of understand people losing their rag in a bar-room brawl, but some kinds of crime are incomprehensible to me — like creeping into quiet old people's houses in the middle of the night and shooting them."

Down a one-way street off the hubbub of Parnell Rd is a narrow blue-and-white villa. Inside, Buckleton's stoking the fireplace. He's in cargo pants and a grey sweater, which gets stripped off to a singlet as his fire hots up.

He lives here with his partner of 12 years, Jan Siegers, a senior scientist in ESR's drugs lab, and daughter Gioja, eight, who saunters in to tell her doting Dad about her day at school. He has two other children with his ex-wife Janine Buckleton-Reid: David, 24, a biology student at the University of Auckland, and Grey, 21, a Massey University trainee pilot.

At home Buckleton's softer, more relaxed and clearly fond of family life. He does his own carpentry work, enjoys cooking — "usually a roast, or flash Italian pasta if I'm trying to show off" — and grows vegetables in a tiny backyard plot.

Ever an environmentalist, he's responsible for the green recycling bins dotted around ESR; it's just instituted its own recycling system, but for years Buckleton brought the bulk of ESR's recyclable rubbish home in his Honda Accord and put it out, getting "in a bit of trouble" with local rubbish collectors.

It's hard to believe this sharply intelligent, resourceful man was once a "dunce" struggling with dyslexia. The condition wasn't picked up until his early 30s (when his sons were both diagnosed), so as a child he was considered slow. "What other kids found trivial I had to force myself to do. I had lots of silly little rules to remember how to spell words. My father was a very driven, successful man and I didn't meet his expectations."

In 1958, his English father David, a chemical and civil engineer, left London with wife Gioja and baby John to work in Asia for Shell Oil, first in Indonesia, then in the Philippines and Malaysia.

When John was six and his brother Tim three, the family moved to New Zealand. It was an affluent childhood "in Remmers [Remuera,

Auckland], darling", with a stay-at-home mother and a largely absent, workaholic father.

When John was nine his parents separated acrimoniously and the boys lived with Gioja, staying with their father and his new wife at weekends. John discovered a love of science when he was given a chemistry set and built a science lab in his father's basement, making gunpowder and blowing up stumps in the backyard.

Says brother Tim, a Whangarei psychiatrist: "What always struck me about John is how he would persevere at things even when he was no good at them, which was usually. He'd conjugate his Latin verbs for hours and was hopeless at sport. Once he came so far last in the 1500-metre running race he got that polite clap you get when you're really bad."

At 13 "everything changed" — he confounded teachers, parents and himself by winning the King's College entrance scholarship. He topped exams from there onwards, drawn to sciences. And from an unsporty, chubby child, he began looking after his diet and rowing before school.

At 16 he won the University of Auckland Junior Scholarship, jumping straight into stage-two chemistry and physics. The following year his mother died from cancer, partly prompting him to pursue a masters degree looking at the structure of the anti-tumour drug m-AMSA. When his father was diagnosed with cancer, he signed up to test m-AMSA — but died in 1980. "Mum didn't mind dying," says John. "Dad didn't want to."

That year, Buckleton married fellow science student Janine Relph (he was 21 and she was 19). But in 1981 he quit his chemistry PhD and become — curiously — a shepherd. He says he'd fancied the idea since pulling lambs from blizzard snow-drifts at an uncle's Canterbury sheep farm. So for two years he watched over a 4800-strong flock on the hills above Lake Rotoma near Manawahe (between Rotorua and Whakatane).

"In my soul I'm a shepherd," he says. "I should be still wandering the hills on a horse with six dogs." Surely he'd need more stimulation? Cue a stern upbraiding not to "underrate" shepherding. "You need good vision and judgment, and you use a lot of environmental science."

But in 1983 Janine suffered a stroke following childbirth "and nothing was ever the same again," he says (she could still walk but it limited her movements). "Those were hard times: no money, no job, sick wife, new child, car didn't go."

So he dusted off his science degrees and went looking for better-paid work. After being turned down for a winery job, he was interviewed for forensics at DSIR (Department of Science and Industrial Research), which became ESR. (After 18 months Janine recovered fully.)

Starting on casework, Buckleton was thrown into the fray without any formal training. In an ad hoc mentor system, established forensic scientists kept an eye on newbies. "I often felt overwhelmed. Sometimes I was terrified."

He and longtime colleague Kevan Walsh (now an ESR senior forensic scientist) pushed for a more formal training system in the late 1980s: "John questioned everything and sometimes that was perceived as troublesome," says Walsh, "but I've learned from him to test and challenge everything rather than just accept it."

Buckleton wrote most early training standards (finishing his own PhD, published in 1990, at night) and since then has instituted exams, quality assurance and peer review. Now, before masters graduates

Buckleton and partner Jan Siegers — with daughter Gioja — vie for gardening space in their tiny Parnell backyard: she wants more flowers, he wants vegetables.

Future shepherd John, seven, and brother Tim, four, on Uncle Jim and Auntie Gert's Canterbury farm; St Kentigern schoolboys with mother Gioja (top).

begin on casework, they have to score 90 per cent in theory and 100 in practical — a world-class training standard.

Today ESR is one of the world's top forensic labs and at the international forefront of DNA applications. It has three international "seconds", following the UK's richly resourced Forensic Science Service: ESR was the second lab in the world to launch DNA casework, the second to establish a national DNA database, and the second to use "Low Copy Number DNA" (a technique identifying minuscule DNA samples).

Though he shrugs it off as being "in the right place at the right times", Buckleton's four stints working at the UK service (1988, 1993, 1995-6 and 2001-2) saw him bring home forensic research techniques that helped him to set up New Zealand's first DNA lab in 1989; then the expertise to launch the National DNA Database (NDD) in 1995. It wasn't a one-way information exchange: FSS principal research scientist Peter Gill says Buckleton "tackled difficult problems no one else could" and made vital contributions to the UK service's knowledge bank.

New Zealand's national database currently claims a 58 per cent hit rate — the highest in the world — meaning 58 per cent of the time a crime sample matches a person in the database. The tally of 72,000 profiles from both criminals and volunteers is growing by 800 to 900 a month.

The DNA database is not to be confused with the Crime Sample Database (CSD), which holds 16,700 unknown DNA profiles from crime scenes; 34 per cent of the time a CSD sample taken from a new crime scene matches another CSD sample. Buckleton's determined to get this rate up to link multiple crimes, citing the crossover between burglary and sex crimes.

He's also the man to thank for bringing the breakthrough Low Copy Number DNA technique to New Zealand crime-solving in November 2006. Considered the next great leap forward for forensic science, LCN identifies "invisible" DNA traces. An offender's DNA can now be extracted from samples too small to see — like nose-prints on glass.

Besides Britain, other countries have been slow to get on board, due to patent costs and hefty set-up expenses. But New Zealand had a trump card: in 1999 Buckleton helped to develop the technique with two top FSS forensic scientists, contributing the statistical theory that underpins the method. With his name on the patent, ESR got no-cost access and its own in-house trainer.

In late 2006 the police and ESR reviewed cold cases and selected 60 major crimes, predominantly homicides and rapes, for LCN analysis in 2007. At the time of going to press 20 were in progress but only one had come through the courts: the March 2002 killing of Janelle Patton, Norfolk Island's first murder in 150 years. LCN analysis linked Nelson chef Glenn McNeill's DNA to the crime scene and Buckleton travelled to the island to testify. In March McNeill was convicted of murder.

The LCN lab is strictly out of bounds to all except LCN scientists but I peek through a window where one sheathed in neck-to-toe overalls, double-layer gloves and a mask stoops over a test tube. With very tiny samples undergoing many rounds of amplification, extreme measures prevent profile degradation. It's a low-airflow lab, at higher pressure than surrounding corridors, so when a door opens air comes out but never goes in. The air's filtered and UV lights run nightly to kill any residual DNA. Even tiny amounts of saliva could damage samples, so there's a no-talking policy both in the lab and at all major crime scenes.

Buckleton, who trains forensic scientists around the world in the technique, describes LCN as "the pinnacle of my career".

In November 2005 the Royal Society of New Zealand elected Buckleton as a fellow. He's picked up numerous accolades, but only a small ESR prize — the 2000 Science Excellence Award — graces his office wall. The others are "probably in a box somewhere".

"In the end your only real judge of how you perform is yourself. Yes, I've done well, but that's mostly down to the wiring in my head, dumb luck and timing."

Professor Bruce Weir, with whom Buckleton worked on the O.J. Simpson case, is chairman of the University of Washington's department of biostatistics and has worked with him on and off for 15 years and co-authored papers. He'd disagree with the "dumb luck" suggestion: "John has the rare gift of an intuitive understanding of quite deep problems and I quickly came to trust his results, and greatly respect his work. Also to count him as a true friend."

While Buckleton's both droll and intense, some say they need time to warm to him. He can be a little intimidating: he likes being difficult, and speaks his mind.

He's certainly the only person this reporter's come across who, when asked for the names of people who might comment for this story, suggests someone who "hates my guts" — Dr Brian McDonald, a fellow forensic scientist, with whom he's had disagreements over their differing approaches to forensic evidence interpretation. "He tried to sort me out in a corridor once," Buckleton says. "He thinks I'm crooked or a liar or something."

McDonald refused to comment.

But Buckleton's ex-wife did. In 1994 the couple separated for reasons

the scientist won't discuss except to say, "We both changed a lot". The happily remarried Janine Buckleton-Reid, business manager at an eye-care company, says she and her ex have remained close since the split. "He is extraordinarily talented and one of life's unique people."

John Buckleton appears enormously self-assured and gregarious, so it's hard to believe his description of himself as a "very shy boy". Brother Tim, however, says people often mistakenly think John is an extrovert when actually he *is* shy.

"He has a strong physical presence so sometimes people feel intimidated, but John's a very gentle, easily hurt person. He calls a spade a spade, but if he makes a harsh comment to someone he agonises about it for weeks."

Tim, who's in a long-term same-sex relationship, says while other family members had issues with it, his brother was hugely supportive when he discovered he was gay. "He raced up to meet my partner Craig. He has a very live-and-let-live attitude. John saved me from drowning when I was four [Tim slipped into a pool] and I know if I was trapped in a burning house he'd walk straight in."

It's 9am and Buckleton, on a coffee break at work, is bleary-eyed. Often he wakes up at 5am and can't get back to sleep. He's starts pacing edgily. Is he restless? "Haunted," he says, resting his chin on his hand. "This world is a hard bloody place and it's not where you really want young, idealistic people to have to live. Most people are actually good, so why is the world like it is? That's something that haunts me." While he doesn't believe this disquiet stems from immersion in a world of violence and victims, he admits that probably hasn't helped.

Two years ago, he admits, he was "very down. At the worst time, I figured I could get drunk, or I could play bridge."

Although he's never had alcoholic leanings, he stopped drinking in the hope it would help to settle his mood and dizzy spells. He also cut down on the "outrageous" hours he'd been working. (He's always looked after his health, watching his diet and regularly doing step-aerobics classes.)

"Despite the world not being what I wanted it to be, it's been very good to me. I'm 48 now, and it's time to pay back."

> "John saved me from drowning when I was four [Tim slipped into a pool] and I know if I was trapped in a burning house he'd walk straight in."
> — Tim Buckleton

For three years, working with ESR Maori development officer Maui Hudson, Buckleton has visited South Auckland secondary schools to talk to young Maori and Pacific Islanders about his work, setting up mock crime scenes and demonstrating how to collect evidence. The aim is to raise school leaving qualifications.

"We use the sexiness of forensic science to try to inspire them about science, or about anything — I don't care what it is as long as they go for a decent degree and job."

Says Hudson: "He keeps things light, humorous, and really engages and questions the students. They call him matua [father], sometimes kaumatua [elder]!"

As well as teaching ESR forensic trainees, Buckleton supervises University of Auckland students with their masters theses (mainly on DNA) and runs a forensic statistics course there. Says student Elisabeth Williams, 25: "I thought forensic statistics was so dry, but he's sold it to all of us.

"Once he came to class dressed as GI Joe, once as James Bond, when he just smiled and didn't say anything. At the end of the class he asked us which way he'd tossed his jacket, in classic Bond style, and no one could remember. That was to demonstrate how inaccurate witness testimony can be."

Buckleton's not too high up the forensics ladder to chip in with groundbreaking population genetics studies. Population genetics develops methods for computing likelihoods for a given configuration of DNA; that is, by working out the characteristics of a particular population group, when a DNA sample is found at a crime, scientists can say how likely it is to have come from the accused.

In 2004 when Aboriginal activist Robert Bropho was on trial for the 1977 rape of a 15-year-old, which produced a child, Buckleton computed that the boy was 3134 times more likely to be Bropho's child than anyone else's. Acquitting Bropho, the judge ruled that this DNA evidence was not strong enough to support a conviction because of the lack of a base population genetics study to corroborate this figure.

Consequently Buckleton read up on Aboriginal history, got the census, took thousands of DNA samples and produced Australia's first Aboriginal population genetics study. Then he trained lawyers, judges and scientists from Australia's National Institute of Forensic Sciences in Aboriginal genetics and anthropology.

In a non-DNA case Bropho was convicted in December 2005 on seven counts of unlawful carnal knowledge of a child under the age of 13. And a trial's pending on another set of charges: Buckleton, who will give evidence, cannot reveal details.

Building strong relationships with international labs is a key ESR role for Buckleton, who speaks with enthusiasm, if a little concern, about the ever-increasing commercialisation of science. Now that companies are making DNA-based products, labs around the world are patenting their ideas, particularly the UK's world-leading Forensic Science Service. But under a partnership agreement, if ESR contributes meaningfully, it can access new FSS technology without cost.

To promote such collaborative relationships, Buckleton travels the world lecturing, training and bringing knowledge back home. Speaking and teaching appointments at conferences and forensic schools in Denmark, Switzerland and Belgium loom from late August to late September, with a 10-day hiking trip sandwiched between.

Then it's back to his desk, where he's immersed in computer-based modelling to investigate where New Zealand's crime-solving losses are and to advise fellow scientists and the police on specific ways to improve them. "Imagine if, of 100 burglaries, only 20 get looked at [not real figures], we only find DNA in four of those, only manage to extract DNA in three of those, and then we have a 58 per cent hit rate; at the end of all this only half a per cent of burglars go to prison because of DNA. A burglar fears being caught but correctly assesses the chance of being caught as small."

But as the opportunities for DNA capture increase, it becomes an uneconomic practice to be a burglar, he says.

"We have so many amazing techniques now. With invisible traces [LCN] it's going to get to the point where it's impossible to enter and leave a property without us knowing."

And within the next decade, he says, juries will be watching animated reconstruction videos "that more or less replay the crime".

"We've been fighting crime forever and now we're actually in a position to start winning. Whether or not I see that happen, I don't know. But I've had the most amazing time. I didn't want to grow up to be Albert Einstein. I wanted to be Martin Luther King. Well, I was never going to make Martin's grade but I wanted to be someone who made things a bit better for people." ■